

SPECIES IMPACT STATEMENT: SUPERB PARROT

Cowra Local Government Area

March 2011

Report Prepared by

OzArk Environmental & Heritage Management Pty Ltd

For R.W. Corkery

on behalf of Cowra Shire Council



OzArk Environmental &
Heritage Management P/L

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1 INTRODUCTION

1.1 INTRODUCTION

In accordance with the requirements of the Director General of the Office of Environment & Heritage (OEH), a Species Impact Statement (SIS) has been prepared by OzArk Environmental & Heritage Management (OzArk) to address the anticipated impacts to the Superb Parrot (*Polytelis swainsonii*) from the proposed expansion of the Gospel Oak Quarry (the Proposal) located approximately 6km southeast of Canowindra within Cowra Local Government Area, NSW.

1.2 FORM OF THE SIS

This Species Impact Statement has been structured to meet all the matters specified in Sections 109 and 110 of the *Threatened Species Conservation Act 1995* (TSC Act) as well as the specific Director-General's requirements for the Proposal, as shown in **Appendix 1**.

1.3 PURPOSE

The purpose of an SIS is to:

- Allow the applicant or proponent to identify threatened species issues and provide appropriate amelioration for adverse impacts resulting from the Proposal;
- Assist consent and determining authorities in the assessment of a development application under Part 4 or request for Part 5 approval under the *Environmental Planning and Assessment Act 1979* (EP&A Act);
- Assist the Director-General in deciding whether or not concurrence should be granted for the purposes of Parts 4 or 5 of the EP&A Act;
- Assist the Director-General or the Minister for the Environment when consulted for the purposes of Parts 4 or 5 of the EP&A Act; and
- Assist the Director-General in the assessment of Section 91 Licence applications lodged under the TSC Act.

1.4 BACKGROUND

This SIS has been prepared to discuss the direct and operational impacts of the Proposal to a population of Superb Parrots within the area surrounding Gospel Oak Quarry. The local population was recorded during previous OzArk surveys (2006a,

2006b, 2009) and in an opportunistic recording in 2010. The local population is considered to be a viable breeding population.

A detailed description of the Proposal is provided in the *Environmental Impact Statement* prepared to support the application for development consent for the quarry (RWC, 2010). In summary, however, the Gospel Oak Quarry has been in operation since at least 1953. The Proposal would see one tree, a Dwyers Red Gum (*Eucalyptus dwyeri*) with a breeding hollow, removed and continued operational affects of the quarry such as blasting and rock crushing. The population is considered habituated to existing operational affects, however, the nature and extent of these impacts to the local population's fecundity¹ remains unknown and untested.

Blasting and rock crushing would, where practicable, be scheduled outside of the breeding period for Superb Parrot. However, where blasting or rock crushing operations would be required during the breeding period, Council has committed to undertaking population surveys prior to and following the initial two blasting and rock crushing campaigns. Should those surveys indicate adverse impacts on the species as a result of the blasting or rock crushing operations, then those operations would cease immediately. However, should both surveys indicate no adverse impacts on the species, Council would continue to undertake those activities during the breeding period for the species.

¹ **Fecundity**, derived from the word *fecund*, generally refers to the ability to reproduce. In biology the definition is more equivalent to fertility, or the *actual* reproductive rate of an organism or population, measured by the number of gametes (eggs), seed set or asexual propagules.

2 GENERAL INFORMATION

2.1 TITLE OF PROPOSED ACTION

Continuation of operations with the Gospel Oak Quarry, via Canowindra, Cowra
Local Government Area NSW.

2.2 NAME AND POSTAL ADDRESS OF PROPONENT

Cowra Shire Council
Street Address: 116 Kendal Street, COWRA NSW 2794
Postal Address: Private Bag 342 COWRA NSW 2794
Phone: (02) 6340 2000
Fax: (02) 6340 2011
Email: council@cowra.nsw.gov.au

2.3 OBJECTIVE OF THE ACTION

Gospel Oak Quarry has been used since 1953 to extract porphyritic quartz diorite materials for general road construction and currently occupies an area of approximately 4.4ha. The Council wishes to expand the extraction area by approximately 1.4ha to cover a total area of approximately 5.8ha. The proposed life of the quarry would be approximately 40 years. The extraction area is within the larger 29.9ha of land owned by the Council, referred to hereafter as the "Project Site" (Figures 1 to 5).

2.4 ACTION OR PROPOSAL

The existing Gospel Oak Quarry currently occupies a 4.4ha area with a proposed extension of the quarry boundaries to occupy an additional (approximately) 1.4ha which would include removal of one Superb Parrot breeding tree (Impact Footprint). Indirect operational effects to the local population of Superb Parrots may include blasting and rock crushing during the breeding period.

2.5 NOT GOING AHEAD WITH THE ACTION

As the quarry doesn't have any approval, not going ahead with the action would result in ceasing production altogether. Continued operation within the existing footprint is not approved.

2.6 FEASIBLE ALTERNATIVES

The Proposal has been revised several times to minimise impacts to suitable breeding hollows within Box-Gum Woodland. However, the proposed extraction area is based on the distribution of the underlying rock resource and, in some cases, it is not possible to avoid clearing native vegetation as feasible alternatives to the expansion and operation of the quarry are limited. Section 2.11 of RWC (2010) provides a description of those feasible alternatives considered and rejected.

Amendments that have been made to the Proposal include:

- The southern boundary of the extraction area was moved approximately 90m to the north. This would result in a reduction of disturbance to approximately 1.4ha of Box Gum Woodland, including one hollow-bearing tree with hollows (Figure 4). This compares with the original proposed disturbance of approximately 3.0ha of Box Gum Woodland, including two hollow-bearing trees.
- The maximum depth of extraction would be deepened to 375 m AHD, or 10m lower than the original proposed final quarry floor.
- The Project Site would be expanded to include all of Lots 173 and 182, DP 750368.

These amendments have reduced the impact to the Superb Parrot population and the associated Box Gum Woodland remnant.

3 ENVIRONMENTAL SETTING

3.1 PROJECT SITE

The Project Site is situated on Lots 173 and 182 DP 750368 located wholly within the Cowra Local Government Area (LGA) and governed by the Cowra Local Environmental Plan (LEP) of 1990.

The Project Site includes the area considered for development approval, including the 1.4ha area of proposed quarry extension. The hatched area on **Figure 4** includes both the existing quarry and the 1.4ha proposed quarry extension.

3.1.1 Vegetation in the Project Site

Present across the Project Site is White Box, Yellow Box, Blakely's Red Gum grassy woodland and derived native grasslands (Box-gum Woodland): a NSW listed Endangered Ecological Community (EEC) and Commonwealth listed Critically EEC. Within the proposed quarry extension area, 0.5ha is disturbed and 0.9ha is Box-gum Woodland (0.7ha in 'low' condition and 0.2ha in 'moderate to good' condition).

3.2 LAND TENURE INFORMATION

The Project Site incorporates all of Lots 173 and 182, DP750368. Both these parcels of land are owned by the Council.

3.3 PROVISION OF RELEVANT PLANS AND MAPS

Figure 1 identifies the location of the Project Site; **Figure 2** is an overview of the location of key habitat elements within the Project Site and **Figure 3** shows land tenure information. **Figure 4** is a comparison between the 2006 and current Impact Footprint and Biodiversity Offset Areas. It can be seen that the Biodiversity Offset Area has been expanded in what was, in 2006, the northern portion of the extraction area.



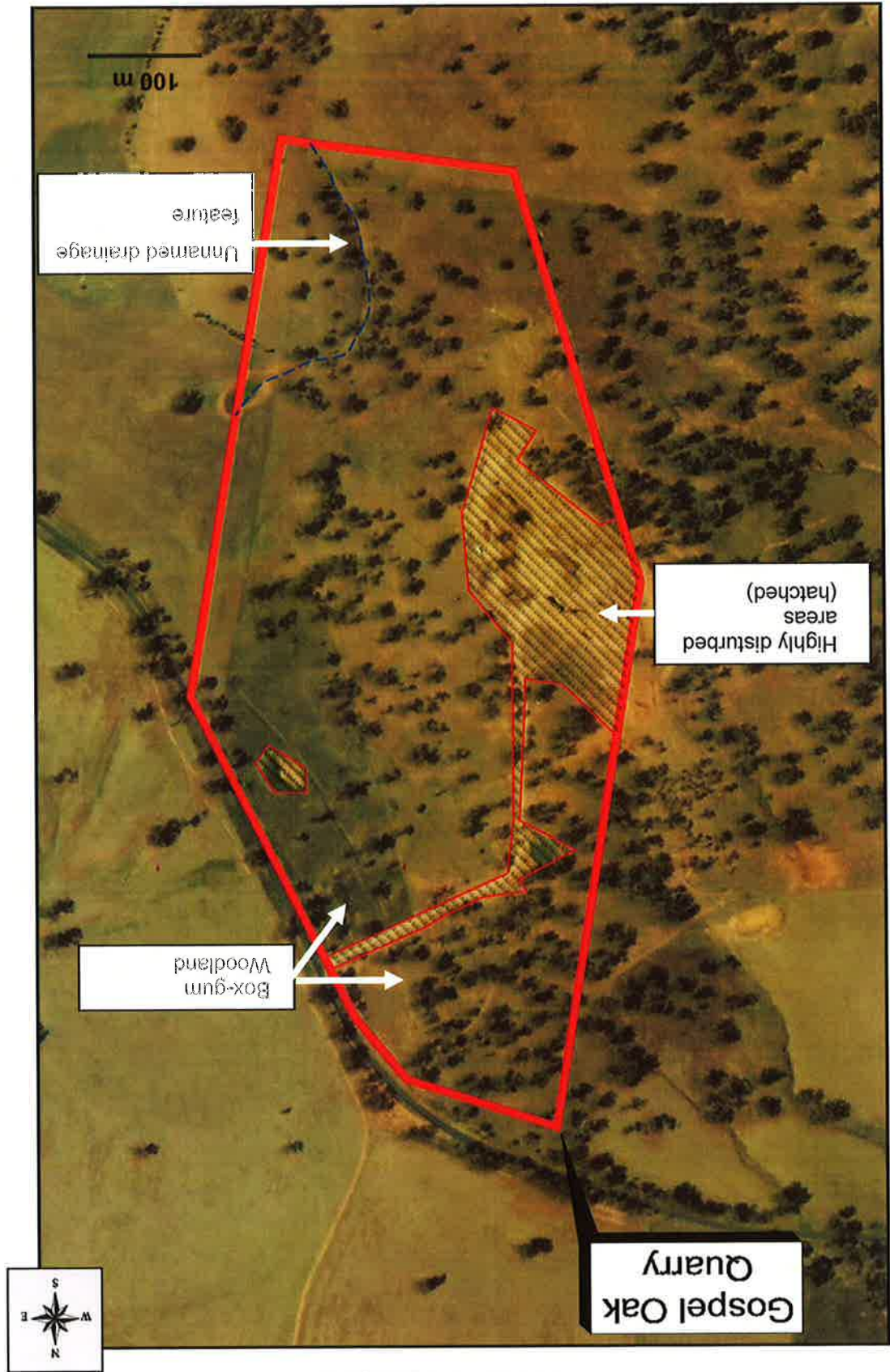
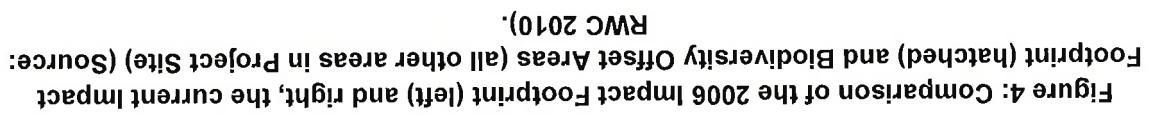


Figure 2: Broad overview of the location of key habitat elements within the Project Site.

RWC 2010).





4 ASSESSMENT SURVEYS

OZARK undertook initial field survey of the Project Site in mid-winter 2006 during a period of freezing rain (heavy rain, showers and constant drizzle); climatic conditions not suited for the detections of the region's threatened fauna. As a result, the precautionary principle was applied to a suite of locally occurring predicted species. During the winter 2006 field survey, a high density of Superb Parrots was recorded in the Project Site and several trees possessing tree hollows suitable for breeding locations were observed. OZARK (2006a) recommended that a targeted assessment be undertaken during the breeding season of the Superb Parrot for the purpose of completing assessments of significance as per the requirements of the TSC and EPBC Acts.

Additional field survey was undertaken in December 2006, during favourable weather conditions: the results of this assessment can be found in OZARK 2006b. Whilst there was no direct evidence of a breeding population within the Project Site, sufficient circumstantial evidence was present to consider the Superb Parrot population at Gospel Oak Quarry as a viable breeding population. OZARK (2006b) reviewed existing assessments of significance undertaken on the Project Site and recommended the need for an SIS.

Further assessments were undertaken in March 2009 (OZARK 2009) with the aim to identify habitat values of a parcel of land in addition to the proposed Biodiversity Offset Area (**Figures 3 to 4**) for Gospel Oak Quarry.

OZARK (2006b) was updated in 2008, 2009 and 2010 as required to reflect changes in the Proposal, as well as, changes to species, populations and communities listed in the TSC and EPBC Acts.

In late 2010 the requirement for an SIS was changed as the Proponent had modified the design of the quarry and confirmed they would implement a range of mitigative measures designed to reduce the direct and operational effects to the Superb Parrot species. In addition, it was confirmed that the Council could offer long-term security of the Project Site (excluding the quarry Impact Footprint) for the purposes of managing the area for conservation as habitat for the Superb Parrot (and indirectly for the preservation of Box-gum Woodland EEC).

The resultant 2010 7-part test considered mitigation and offsets that would result in a 'maintain or improve' result for the species. A key recommendation in OZARK (2006a) that was carried through to the 2010 update was for the Proponent to seek further advice directly from OEH Threatened Species Unit concerning management of effects to

the Superb Parrot, thus all documentation was forwarded to OEH for comment in 2009 (relating to offsets) and 2010 (relating to the assessment of significance).

OEH responded that proposed offsetting and mitigation are not attributes to consider for the 7-part test and noted that a Species Impact Statement would be the appropriate mechanism to demonstrate the effect to the local Superb Parrot population. This SIS serves to implement OEH's instruction.

An informal site visit (no associated report) was undertaken during December 2010 (Super Parrot breeding period) to gauge the status of the local population of Superb Parrot in the Project Site prior to writing this SIS. This visit was also used to establish if sheep had been removed in the Box-gum Woodland (recommended in OZark 2006b) and if so, the resultant natural recovery of native ground covers.²

4.1.1 Threatened species or populations recorded in the Project Site

NSW Wildlife Atlas and NSW Bionet searches, in addition to the schedules of the TSC and EPBC Acts, were conducted to support the 2006a, 2006b, 2009 and 2010 OZark reports in identifying previously recorded threatened species or potential threatened species habitat within the Project Site. Species considered likely to occur in the Project Site included:

- Swift Parrot (*Lathamus discolor*) (E) TSC Act; (E) EPBC Act
 - This species (n=3 individuals) were observed overflying the Project Site in OZark (2006a) and has not been observed thereafter.
- Superb Parrot (*Polytelis swainsonii*) (V) TSC Act; (V) EPBC Act
 - Identified each time a field assessment is undertaken in or adjacent to the Project Site.
- Barking Owl (*Ninox connexens*) (V) TSC Act
 - Considered as having potential to occur in OZark (2006a) not detected using call playback and spotlighting in OZark (2006b) and subsequently considered unlikely to be present.
- Brown Treecreeper (*Climacteris picumnus*) (V) TSC Act

² Superb Parrot population; status December 2010: No evidence of breeding in tree hollows, precautionary principle implemented assuming that a breeding population still occurs but was not observed (an extant breeding population). Six individual Superb Parrots were recorded in Project Site. A thick, healthy and diverse ground cover was observed. Some weed control was required.

- Noted as having potential to occur in OzArk (2006a). Was not recorded after targeted assessment in OzArk (2006b) and thereafter noted as being unlikely to occur.
- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*) (V) TSC Act
- Noted as having potential to occur in OzArk (2006a). Was not recorded after targeted assessment in OzArk (2006b) and thereafter noted as being unlikely to occur.
- Turquoise Parrot (*Neophema pulchella*) (V) TSC Act
- Noted as having potential to occur in OzArk (2006a). Was not recorded after targeted assessment in OzArk (2006b) and thereafter noted as being unlikely to occur.
- Painted Honeyeater (*Grantiella picta*) (V) TSC Act
- Noted as having potential to occur in OzArk (2006a). Was not recorded after targeted assessment in OzArk (2006b) and thereafter noted as being unlikely to occur.
- Little Pied Bat (*Chalinolobus picatus*) (V) TSC Act; EPBC Act
- Noted as having potential to occur in OzArk (2006a). Was not recorded after targeted assessment in OzArk (2006b) and thereafter noted as being unlikely to occur.
- Yellow-bellied Sheath-tailed-bat (*Saccolaimus flaviventris*) (V) TSC Act; EPBC Act
- Noted as having potential to occur in OzArk (2006a). Was not recorded after targeted assessment in OzArk (2006b) and thereafter noted as being unlikely to occur.
- Greater Long-eared Bat (*Nyctophilus timoriensis*) (V) TSC Act; EPBC Act
- Not identified as having the potential to occur through desktop assessments but recorded as a result of targeted assessment (AnaBat ultrasonic detection; one individual; one pass over) was subsequently determined that the nature and extent of the proposed impact to the local population of this species would not be significant.

4.1.2 Potentially Affected Species

The Superb Parrot is considered to be the only potentially affected species. Effects would be 'direct' resulting in a proposal to remove one potential breeding tree and 'indirect' i.e. ongoing operational impacts that have been experienced since at least 1953 and those associated with the Proposal for the next 40 years. Management of these have been detailed below:

Direct Effects

1. 100 breeding hollows would be conserved or created:
 - a. 89 nest boxes suitable as breeding locations for the Superb Parrot would be placed in suitable trees in the Project Site.
 - b. Managing the remaining 22ha (that include eleven suitable breeding hollow bearing trees = 100 with nest boxes) of Box-gum Woodland for the long-term benefit of the species.

Indirect Effects

1. Blasting and rock crushing scheduled where possible outside the breeding period;
2. In the event that blasting or rock crushing are required during the breeding period, a qualified ecologist would study the pre- and post-effects to the Superb Parrot population resulting from the activity of blasting and rock crushing at the quarry. This study would assess any effects that the on-going activity of the quarry has during the breeding season of the Superb Parrot. This recommendation addresses the 'unknown' consequences of indirect effects to the population to date; thus providing a platform for the long term management of this and other regional populations of the Superb Parrot.

4.1.3 Superb Parrot Field Assessment Results

OZark 2006b demonstrated that whilst suitable hollows are available within the Project Site (Figure 4 and Table 1) no direct evidence, such as parent birds returning and leaving hollows, was recorded. However, substantial circumstantial evidence of breeding was recorded including:

- Down attached to fledgling feathers at the base of a hollow bearing tree with white wash at its entrance;
- Approximately 10–25% of 100 birds observed in the Project Site were young/recently fledged;

- Parent birds observed crop feeding fledglings within the Project Site on three separate occasions;

- The Project Site is located within the largest, and one of the few remnant woodland fragments, in the region. All woodland fragments in the locality appeared to contain perching Superb Parrots in the early evening, and;
 - There is a high extent of woodland clearing in the region thus reducing the availability of mature hollow bearing trees; hence, where there is a suitable hollow there is a higher probability of it being utilised.

The following trees were recorded as having hollows suitable for breeding within the Project Site (**Table 1**). There are two things to note when reviewing this table:

- More hollows may occur that were not visible or observed in the Project Site, however, those trees that were close to the edge of the existing quarry were given particular attention.

- 'No direct evidence of utilisation' does not mean that the hollow was not used for breeding by the species during December 2006: it simply means that tell-tale evidence confirming the hollow was recently utilised was not present.

Table 1: Location of hollows suitable for breeding purposes for Superb Parrot in the Project Site.

Species of tree	AGD E	AGD N	Comments	Impact
White box	658973	6280457	Suitable hollow: no other direct evidence of utilisation.	No
White box	658920	6280486	Suitable hollow: no other direct evidence of utilisation.	No
White box	653969	6280169	White wash at entrance of hollow; down and fledgling feathers noted at base of tree.	No
White box	658997	6280127	Suitable hollow; no other direct evidence of utilisation.	No
White box	658966	6280112	Two suitable hollows: no other direct evidence of utilisation.	No
White box	658937	6280808	Suitable hollow: no other direct evidence of utilisation.	No
White box	659002	6280736	Very high quality hollow: no other direct evidence of utilisation.	No
White box	658908	6280695	Suitable hollow: no other direct evidence of utilisation.	No
White box	658851	6280498	Suitable hollow: no other direct evidence of utilisation.	No
White box	658986	6280483	Suitable hollow: no other direct evidence of utilisation.	No
White box	659035	6280453	Suitable hollow: no other direct evidence of utilisation.	No

Species of tree	AGD E	AGD N	Comments	Impact
Dwyer's Red Gum	658912	6280192	Very high quality hollow: no other direct evidence of utilisation, however, family of six perching on tree crop feeding young.	Yes

As a result of the winter and summer assessments (OZark 2006a, 2006b and a due diligence inspection in 2010), OZark determined that a breeding population of Superb Parrot (*Polytelis swainsonii*) was likely to exist within the Project Site, for the following reasons:

- Birds were not observed within or going in nor out of the hollows available in the Project Site: thus direct evidence for a breeding population is not present;

- It was assumed from observations in the field that Superb Parrots in region had clutches early in the 2006 and 2010/11 breeding season. All young birds positively identified on site were fledglings and perched; as a result they were no longer hollow dependant (that is likely to influence the observation above). It is also recognised that these young birds may have flown in from breeding sites outside of the Project Site.

- In total, 80–100 Superb Parrots were observed within the Project Site on both occasions during 2006. Not all birds observed displayed sexual dimorphism and approximately 10–25% of those observed were noted as being young based upon coloration and, to a lesser degree, physical size;
- During OZark (2006b) feather down attached to, and found in association with, fledgling feathers was observed at the base of one tree in the Project Site with white wash also present at the entrance to the hollow. It is also recognised that this is not conclusive evidence the tree had been used for breeding, however, the potential for it to be utilised for this purpose it is considered to be high;

- During OZark (2006b) three separate small family units of three to six birds were seen within the Project Site crop feeding young in response to their begging calls.

4.2 SUPERB PARROT: THREATENED SPECIES ASSESSMENT

4.2.1 Local Regional Abundance

The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter when they migrate north to the region of the upper Namoi and

Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. It is estimated that there are less than 5000 breeding pairs left in the wild (DECCW 2011). The Cowra/Canowindra area (the Cowra Local Government Area) is the epicentre of the main density of the Superb Parrot in NSW and, as such, it is recognised as having a viable and important local population (Cameron, 2006 pers. obs). More specifically, the current Project Site is likely to be part of a larger key source population for breeding and dispersal of this species and, as such, it is defined under the EPBC Act as 'an important population' of a vulnerable species.

4.2.2 Vegetation

The habitat in which this parrot occurs is Box-gum Woodland. This community is listed as 'endangered' under the TSC Act and is of sufficient quality and quantity to meet the criteria to be listed as 'critically endangered' under the EPBC Act. The Project Site consists of a 22ha area of Box-gum Woodland with approximately 50 mature and semi-mature native trees that would be managed for conservation. The Proposal would see 3ha of additional land disturbed. Of this, approximately 0.5ha is disturbed/cleared and 2.0ha is Box-gum Woodland (currently disturbed = in 'low' condition). The remaining 0.5ha has isolated trees (one with a hollow suitable for breeding) and sparse native/exotic ground cover in ('moderate to good' condition).

4.2.3 Habitat Use

Habitat use is associated with the local woodland assemblages and the incidence of preferred nest tree species and food resources within the Project Site. Between 80 and 100 Superb Parrots were detected during dusk/dawn on a number of occasions (OzArk 2006a, 2006b and 2009: only six individuals were observed in December 2010). Thus, this species and its habitat are known to occur within the Project Site. Other observations not directly related to determining if the locality is used for breeding included:

- Superb Parrot activity in the Project Site was low during the day with a significant increase in the late afternoon;

- Many birds were observed flying to the area from surrounding farmland;

- The Project Site, at bare minimum, is an important perching and refuge area for the species. Whilst feeding was observed to be undertaken at the locality, its importance as a feeding ground is unlikely to be any more significant than that of

surrounding farmland. The difference within the Project Site is the possibility of having somewhere to perch;

- In December 2006 there were extremely high levels of grazing within the Project Site that resulted in a complete removal of all groundcover across the Project Site. This reduced the density of Superb Parrots feeding within the Project Site compared to a neighbouring property; but did not prevent some feeding occurring within the Project Site. As the Proponent, following recommendations set out in OZark 2006b, excluded grazing from the Project Site, the ground layer was thick and healthy by December 2010 and in need of only targeted weed management;
- Other small remnant patches of woodland adjacent to the Project Site appeared to support additional populations of Superb Parrot. This statement was based upon observation of the birds, as well as the identification of the distinctive calls of the species. The hill on which Gospel Oak Quarry is situated is the highest in the area and provided an excellent vantage point to observe and hear the species on surrounding land, and;
- Gospel Oak Quarry, and the connected remnant woodland on neighbouring properties, provide perching locations for a large number of Superb Parrot that utilise the area in the late afternoon and overnight.

4.2.4 Assessment of Significance

A revised 7-part test and Assessment of Significance has been provided as **Tables 2 and 3**. These only consider the impact of the Proposal excluding proposed offsets, amelioration or mitigation.

Table 2: Revised 7-part test for Superb Parrot.

Superb parrot (<i>Polytelis swainsonii</i>), (V) TSC Act.	1) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.
• Approximately 100 individuals of this species were observed within the Project Site in 2006 (OZark 2006a and 2006b), with at least 10–25% of those observed being fledglings (OZark 2006b). • In OZark (2006b) no direct evidence was found (i.e. parent birds going in and out of hollows to feed young) of breeding. However, down and fledgling feathers were recorded outside a hollow bearing tree with white wash at the entrance and 11 other trees in the immediate vicinity were noted to possess habitat values suitable as breeding locations for the local population. • It is suspected that the 2006/2007 breeding season begun early in the Project Site (early September) and hollows at the time (late December 2006) had been recently abandoned, however, three pairs of adult birds were observed to be crop feeding perching young on a Dwyers Red Gum which contained a suitable hollow for breeding with a polished entrance. • The density of birds within the Project Site is considered locally high for the	1) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

Superb parrot (<i>Polytelis swainsonii</i>), (V) TSC Act	• Clearing within the Project Site will remove one hollow-bearing tree, a Dwyers Red Gum, with a hollow potentially utilised for breeding. • Affects associated with the operation of the quarry i.e. timing of works such as blasting or using heavy noisy machinery during the chick rearing period may cause adults to mis-mother their young. It is noted that the operational effect has been ongoing since at least 1953 and that a modified regime is now proposed where the activity would be scheduled, where possible, outside of the breeding period. • As the operational effects of the quarry to the species remain unknown (i.e. there is no empirical evidence to prove that existing work in the quarry does not negatively affect the species), an SIS is requisite.	Not relevant	3) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: (i) is likely to have an adverse effect on the extent of the ecological community such that its occurrence is likely to be placed at risk of extinction, or (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,	4) in relation to habitat of a threatened species, population or ecological community: i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the
	• The Proposal would see an additional 1.4ha of disturbance. 0.7ha is within existing disturbed areas (Disturbed Area Box-gum Woodland) and 0.2ha would occur in areas occupied by isolated remnant trees comprising moderate to good condition Box-gum Woodland species (including one hollow bearing tree suited as a breeding site for Superb Parrot) with a mixed exotic/native ground cover. Note the remaining 0.5ha is 'disturbed'. • Fragmentation and/or isolation of potential habitat within the Project Site would not occur. • The importance of the habitat to be removed lies predominantly with the provision of suitable breeding hollows in an area with proximity to permanent water (Belubula River). Breeding hollows are associated with old growth eucalypts and, secondly, importance can be directly linked to the possible operational effects of noise and other activities that may cause mis-mothering of the young in the broader Project Site. There is no evidence to confirm or deny past, existing or future operational effects to the population.			

Superb parrot (<i>Polytelis swainsonii</i>), (V) TSC Act	species, population or ecological community in the locality.	5) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	6) whether the actions proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	7) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	Conclusion
Critical habitat for the Superb Parrot has not been declared and at present there are no habitats listed as critical in the locality. A recovery plan or threat abatement plan for the Superb Parrot has not been written. - The following threatening processes apply to this species: - Clearing of native vegetation would be a component of the Proposal, and; - Loss of tree hollows. A high density of Superb Parrots was observed within the Project Site in 2006/2007 breeding season and individuals were recorded during 2009 and 2010 in, or adjacent to, the Project Site. The precautionary principle has been applied resulting in the Project Site being considered home to a breeding population. The Proposal involves the loss of one hollow-bearing tree, a Dwyers Red Gum with a hollow suitable for breeding, in c.0.7ha of Disturbed Area Box-gum Woodland and 0.2ha of moderate-good Box-gum Woodland (c. 25 trees in total in the area of disturbance; all, but one, are small). The Proposal will have a direct effect to the Superb Parrot with the loss of one breeding hollow being the most significant direct effect. Operational effects have been historical (since at least 1953), current and are proposed over the next 40 years. The suspected, most significant, operational effects are associated with blasting and rock crushing during the Superb Parrot breeding period. Whilst it is acknowledged that the population has been <i>in situ</i> since at least 1953, the question remains as to whether operation of the quarry reduces fecundity of the population. Currently there is no evidence to confirm or deny this question. Recommendations in the EIS have seen a requirement to blast and crush rock, where practicable, outside of the breeding period. Where blasting is required during the breeding period, the Proponent has agreed to engage a fully qualified ecologist to monitor rock crushing/blasting effects to the <i>in situ</i> population both before and after the blasting and/or rock crushing campaign. The methodology to undertake this would be developed with input from OEH Threatened Species Unit and the results fed back to OEH and the Proponent to use for ongoing management. With the current body of knowledge and evidence that a breeding population has remained <i>in situ</i> since at least 1953 during operation of the quarry, it can be stated that it is unlikely that the population would become locally extinct should these activities be undertaken during the breeding season. Unfortunately 'unlikely' does not provide empirical evidence required by OEH to guarantee to long term survival of the local population and as such an SIS is required.					

Table 3: Revised Assessment of Significance for Superb Parrot.

Superb Parrot (<i>Polytelis swainsonii</i>) (V) EPBC Act.	An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
• The Project Site contains an 'important population' as it is a likely key source for breeding and dispersal. • Approximately 100 individuals of this species were observed within the Project Site, with at least 10–25% of those observed being fledglings in December 2006 (See OZark 2006a; OZark 2006b). • Although no direct evidence was found (i.e. parent birds going in and out of hollows to feed young) down and fledgling feathers were recorded outside a hollow bearing tree with white wash at the entrance and 11 other trees in the immediate vicinity were noted to possess habitat values for a breeding population. • It is suspected that Superb Parrot breeding began early in the season: in 2006 hollows were recently abandoned at the time of assessment. However, three pairs of adult birds were observed to be crop feeding perching young at the Project Site. • This density of birds is considered high for the species and groups of up to 20, were seen feeding on the ground together at the Project Site. • Clearing within the Project Site will remove one hollow-bearing Dwyers Red Gum with a hollow potentially utilised for breeding. • Operational effects associated with timing of works such as blasting or using heavy noisy machinery during the chick rearing period may cause adults to mis-mother their young, but there is no proof to confirm or deny this. Recommendations in the EIS for the Proposal include a requirement to undertake these activities outside the breeding period. If rock crushing/blasting is required during the breeding period then a suitably qualified ecologist should be engaged to assess the effects on the breeding population of Superb Parrots before and after a scheduled event such as blasting. The results would inform future management of the population. • With the current body of knowledge and evidence that a breeding population has remained <i>in situ</i> since at least 1953 while the quarry has been operating, it can be stated that it is unlikely that the population would become locally extinct. Unfortunately 'unlikely' does not provide empirical evidence required by SEWPAC to guarantee to long term survival of the local population. To manage this issue further assessment (pre and post crushing assessments) would provide additional information that would be used to determine the need for referral to SEWPAC.	➤ lead to a long-term decrease in the size of a important population, or
• The proposal will initially reduce the area of occupancy by one tree with a potential breeding hollow. As operational effects are ongoing (i.e. are historical, current and proposed) it would not change the status quo (i.e. there would remain a constant affect to the population rather than a new effect).	➤ reduce the area of occupancy of an important population, or
• The proposal will not fragment the existing population into two or more separate populations.	➤ fragment the existing important population³ into two or more populations, or
• The proposal will remove one tree with a hollow suitable for breeding. Hollows are limited in abundance in the region due to high levels of land	➤ adversely affect habitat critical⁴ to the survival of a species, or

³ An important population is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

- key source populations either for breeding or dispersal,
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range

⁴ Habitat critical to the survival of a species refers to:

- habitat identified in a recovery plan for the species as habitat critical for those species or communities; and/or
- i) habitat listed on the Register of Critical Habitat maintained by the Minister under the Act; and/or

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	Superb Parrot (<i>Polytelis swainsonii</i>) (V) EPBC Act.
	Operational effects such as blasting/rock crushing etc, are not new within the Project Site and there is no evidence that the effect is adverse or otherwise (hence the requirement for a referral). The EIS includes actions to manage the issue, and where unavoidable, gather evidence for the long-term management of the species.
➤ disrupt the breeding cycle of a population, or	- The proposed action (removal of one potential breeding tree) and operation of the quarry (heavy vehicles, machinery and blasting) have potential to adversely affect breeding habitat and breeding opportunity for this species. Administrative controls would ensure that blasting and rock crushing would be avoided from September to the end of January each year. This would mitigate the impact of operational activities during a critical period in the bird's life cycle. Should this not be possible, Council has committed to undertake a pre and post activity assessment by a qualified ecologist to measure the effect of the impact. Results would then inform the long-term management of the population. - In stating the above, it is also important to note the local population of birds has not abandoned the area when quarrying activities commenced over 50 years ago and an otherwise 'expected' ratio of young were observed with their parents in the Project Site during the OZArk 2006b assessment.
➤ modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or	- The proposal will destroy habitat for the species (one potential breeding tree). - The proposal has increased the quality of habitat available for the species. After OZArk (2006b) the Proponent removed sheep from the Project Site which resulted in the natural recovery of the Box-gum Woodland ground layer. A due diligence site inspection was undertaken in December 2010 prior to writing this document. This inspection confirmed that the sheep had in fact been removed and that groundcover was returning.
➤ result in <i>invasive species</i> that are harmful to a vulnerable species becoming established in the species habitat, or	Removal of sheep from the Project Site, followed by the natural recovery of the Box-gum Woodland ground cover seen in December 2010, has efficiently addressed invasive issues observed during December 2006.
➤ interferes substantially with the recovery of the species.	- Destroying the availability, abundance and quality of habitat by removing one breeding hollow and continuing to expose the species to indirect impacts from noise etc during the chick rearing season has potential to interfere with the recovery of this species. - Operational effects (blasting/rock crushing etc) are not new and there is no evidence that the effect is adverse or otherwise. The EIS includes actions to manage the issue and where unavoidable gather evidence for the long-term management of the species.
Conclusion	With the current body of knowledge and evidence that a breeding population has remained <i>in situ</i> since at least 1953 while the quarry has been operating, it can be stated that it is unlikely that the population would become locally extinct. Unfortunately 'unlikely' does not provide empirical evidence required by SEWPAC to guarantee to long term survival of the local population. To manage this issue further assessment (pre and post crushing assessments)

ii) areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal;
- for succession;
- to maintain genetic diversity and long term evolutionary development; or
- for the reintroduction of populations or recovery of the species.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Superb Parrot (<i>Polytelis swainsonii</i>) (V) EPBC Act.	would provide additional information that would be used to determine the need for referral to SEWPAC.

5 ASSESSMENT OF LIKELY IMPACT ON THE SUPERB PARROT

5.1 CURRENT IMPACTS AND ISSUES

The following summarises the key issues:

- The precautionary principle has been applied to the Project Site where it is considered a breeding location for the Superb Parrot, a species listed as threatened under the TSC and EPBC Acts;

- One of twelve observed hollow-bearing trees suitable for breeding would be removed (a Dwyers Red Gum) and operational affects associated with blasting, rock crushing etc., would be avoided during breeding periods where practicable.

- There is a dilemma in managing a known effect (direct habitat removal) with a possible affect (historical, current and proposed blasting, rock crushing etc). As the area has been quarried since 1953, with apparently little effect on the *in situ* breeding population, operational affects are, for the purposes of this document, considered to have a significantly lower probability to cause long-term impact to the local population when compared with direct habitat removal.

- In previous discussions, OEH requested a Biodiversity Offset Area of at least 27 ha of Box-gum Woodland, including 100 hollow bearing trees. The Proponent has offered 22ha with 11 hollow bearing trees and will 'make up' the rest through erecting suitable artificial next boxes at the Project Site;

- The Proponent, to date, has not been able to secure additional land as requested by OEH, and without OEH consent, the application cannot be approved.

5.2 DIRECT IMPACTS AS A RESULT OF THE PROPOSAL

5.2.1 Habitat Removal

Habitat for the Superb Parrot occurs within the Project Site in vegetation mapped in Figures 2 to 4.

The Proposal will remove one hollow bearing tree suitable for breeding. The loss of this tree represents 1 of 12 known potential breeding habitat trees within the Project Site. Hollows are limited in abundance in the region due to high levels of land clearing. Therefore a critical habitat element will be lost. Breeding habitat and opportunity is critical for the long term survival of the local population.

5.3 INDIRECT IMPACTS AS A RESULT OF THE PROPOSAL

5.3.1 Noise

Changes in visual parameters and noise associated with people, machinery, vehicle traffic, general quarrying, ground vibration and blasting from quarry operations, has potential to affect Superb Parrot behaviour and use of adjacent areas; however, there is no empirical evidence to test this assumption.

Quarrying has been ongoing since 1953 in the Project Site and an *in situ* breeding population remains. However empirical data would help us to understand what effects the operation of the quarry has to the fecundity of the local population. Data gained can help inform future management of the local Superb Parrot population.

OZARK 2009 (an update of OZARK 2006b) recommended that no blasting or crushing should occur during the breeding season (September to late January). This period was subsequently identified as the Council's key road construction period. While Council has committed to abide by this recommendations, road construction and maintenance demands makes stopping blasting and rock crushing all together during this period very difficult. While these activities will be limited during the breeding season, should they be required, the effect of sudden noise on breeding birds is unknown.

5.3.2 Dust

Dust will occur as a result of crushing and blasting activities. If left unmanaged, dust has the potential to cover/smother and kill native vegetation and wildlife habitats and reduce air quality.

It is expected that dust will remain within guideline limits. However, conditions of consent have been included in the Environmental Impact Assessment (EIS; R.W. Corkery 2010) to minimise impacts.

Establishment of earth bunds and maintenance of a buffer zone between active quarrying activities and the Biodiversity Offset Area (see EIS section 6.1) will assist in the prevention of dust having negative impacts on these habitats.

5.3.3 Odour

Odour is not expected to change as a result of the Proposal. Odour emissions are expected to meet the odour performance criteria proposed in the NSW EPA Draft Odour Policy (2001).

5.3.4 Artificial Light

Increased artificial lighting will not occur as operations will be daylight only.

5.3.5 Ongoing Quarry Activities

The 2010 EIA details the timing of works within the quarry, which follows the existing pattern of activity. If, as suspected, the Superb Parrot local population has become habituated to anthropogenic disturbances associated with ongoing quarry activities since at least 1953, the significance of the operational effect we are addressing would not be as significant as they may be to a 'naive population'. Superb Parrots are frequently recorded in highly disturbed urban environments with very high levels of human presence; such as within the Gospel Oak Quarry, Chiltern Quarry and along major regional transport routes (Higgins 1999; Higgins et al. 2001; pers. obs. Cameron 2006, 2006a, 2009; pers. obs.). This suggests that these species can and do become habituated to anthropogenic disturbances and have a demonstrated ability to breed in these environments. It remains unknown if such environments have an impact to the fecundity of individuals utilising resources within them.

Thus, the local population, in the absence of further evidence and taking into account the ongoing operation of the quarry, appears to tolerate existing level of disturbance and as such are more likely to respond to amelioration in conjunction with continued use of the area than a naive population.

Ground disturbing activities (heavy vehicle movements, tree clearing, rubbish dumping and pushing rubbish around the base of trees) were observed to have taken place between the winter and summer 2006 survey during the Superb Parrot breeding season. It is possible that these quarry activities may have affected breeding within the Project Site, however, it does not appear to result in the long-term abandonment of the Project Site by the species.

Other possible impacts to the Superb Parrot include:

- Increased human disturbance to areas of native vegetation;
- Increased disturbance to sensitive fauna species;
- Accidental loss of or damage to retained vegetation during the construction and operation of the quarry;
- Reductions in population size of some regionally significant flora species, and;
- Reduction in viability of retained habitat.

Potential indirect impacts include the following:

- Weed-invasion, rubbish dumping or accidental damage during construction, and associated edge effects;
- Loss of any retained vegetation as a result of changed environmental conditions, particularly through weed invasion or altered hydrology;
- Altered fire or other disturbance regimes associated with increased human activity;
- Reduced viability of some fauna species on the site in the longer term due to reductions in population size and reduced habitat area, and;
- Degradation of habitat values in the local area due to incremental loss of remnant vegetation.

6 DISCUSSION OF CONSERVATION STATUS

The Superb Parrot is listed as vulnerable under both NSW (TSC Act) and National legislation (EPBC Act). The Superb Parrot is also listed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Threats to the Superb Parrot include:

- Removal of hollow bearing trees;
- Clearing of woodland remnants;
- Poor regeneration of nesting trees and food resources;
- Feeding on grain spills and subsequently being struck by vehicles;
- Loss of hollows to feral bees and native and exotic hollow-nesting birds, and;
- Illegal trapping which can also result in the destruction of hollows.

Key Threatening Processes (KTPs) listed under the TSC Act relevant to the proposal that may impact on potential habitat for the Superb Parrot include:

- **Clearing of native vegetation.** The Proposal would result in the removal of approximately 0.7ha of Disturbed Area Box-gum Woodland (this area is devoid of a native ground cover) and 0.2ha of moderate to good quality Box-gum Woodland habitat possessing 25 young trees and one Dwyers Red Gum with a suitable breeding hollow (note remaining 0.5ha is 'disturbed' or totally cleared). The removal of one hollow bearing tree may result in increasing competition between hollow dependant fauna for the remaining hollows. It is also possible that some of the 89 artificial nest boxes to be erected in the Project Site would be utilised by feral honey bees (*Apis mellifera*) if an adequate monitoring programme is not implemented.

- **Invasion of native plant communities by exotic perennial grasses.** In winter 2006, the native ground covers were assessed as being 'high quality'. By December 2006 they were completely removed by sheep grazing. The Proponent subsequently removed all livestock from the Project Site (in 2007 or 2008) and natural recovery of the ground layer has occurred. The threats posed by perennial grasses were assessed in 2010 as 'low'. The action undertaken by the Proponent has increased the quality of a feeding resource afforded to the Superb Parrot since December 2006.

- **Loss of hollow-bearing trees.** The loss of one of the 12 known hollow bearing trees in the Project Site will reduce the local population's choice of breeding locations by at approximately 8.3%.

- **Predation by the feral cat (*Felis catus*).** It is unlikely that the Proposal would change the nature or extent of the movement of feral cats through the Project Site and it expected that predation rates would remain constant.

- **Predation by the European Red Fox (*Vulpes vulpes*).** – It is unlikely that the Proposal would increase the movement of foxes through the Project Site and it expected that predation rates would remain constant.

- **Predation and hybridisation of feral dogs (*Canis lupus familiaris*).** It is unlikely that the Proposal would increase the movement of feral dogs through the Project Site and it expected that predation rates would remain constant.

- **Removal of dead wood and dead trees.** The loss of dead wood and dead trees (exclusive of one breeding hollow to be removed) may reduce potential resting and perching places for the Superb Parrot.

KTPs listed under the EPBC Act relevant to the proposal that may impact on potential habitat for the Superb Parrot include:

- Land Clearance: see above;
- Predation by the European red fox (*Vulpes vulpes*), and;
- Predation by the feral cat (*Felis catus*).

There are currently no recovery plans or threat abatement plans for the Superb Parrot. OEH has identified 22 priority actions to help recover the Superb Parrot in New South Wales. There is a draft national recovery plan in preparation for the Superb Parrot.

Other plans and documents relating to the Superb Parrot as identified on the EPBC website 'Species Profile for the Superb Parrot', include:

- Threat Abatement Plan for Beak and Feather Disease Affecting Endangered Psittacine Species (Department of the Environment and Heritage (DEH⁵), 2005q) (Threat Abatement Plan).
- Survey Guidelines for Australia's Threatened Birds. EPBC Act survey guidelines 6.2 (Department of the Environment, Water, Heritage and the Arts (DEWHA⁶), 2010i) (Admin Guideline).

⁵ Now SEWPAC
⁶ Also now SEWPAC

- Trees with Hollows. North East NSW. Natural Resource Management Advisory Series: Note 1 (NSW Department of Environment, Climate Change and Water (NSW DECCW), 2004g) (Information Sheet).
- Superb Parrot - profile (NSW Department of Environment, Climate Change and Water (NSW DECCW), 2005jm) (Internet).

7 ADDITIONAL INFORMATION

7.1 QUALIFICATIONS AND EXPERIENCE

The 2006, 2006a, 2009 and 2010 field assessment and documentation of the SIS were undertaken by Phillip Cameron (principal ecologist and senior project manager) of OzArk. Qualifications: Bachelor of Science, Associate Diploma of Applied Science, Member of NSW Ecological Consulting Society.

The 2009 field assessment and SIS report preparation was undertaken by Heidi Kolkert (ecologist) of OzArk. Qualifications: Bachelor of Arts, Bachelor of Science (Honours), Associate Member of NSW Ecological Consulting Society.

7.2 OTHER APPROVALS REQUIRED FOR THE DEVELOPMENT ACTIVITY

The Applicant requires development consent from Cowra Shire Council in accordance with the provisions of the *Environmental Planning and Assessment Act 1979*. In order to obtain development consent, the development application for the proposal needs to be accompanied by an Environmental Impact Statement as the proposal is "designated development". As the Council is the Applicant for the proposed continuation of quarrying activities and to avoid perceptions of conflicts of interest, the Joint Regional Planning Panel will determine the application for development consent.

An environment protection licence would also be required under Section 48 (Schedule 1) of the *Protection of the Environment Operations Act 1997* as the maximum annual extraction rate of 50 000lcm exceeds the 30 000m³ per year threshold level for a licence. The approval body responsible for issuing an environment protection licence is the Department of Environment Climate Change and Water. The Council intends to apply for an environment protection licence concurrently with the development consent.

No construction certificate is required from Council for the proposed facilities/amenities as they would not be permanent structures.

The requirement for an environment protection licence, in addition to development consent, means that the Proposal is considered an "integrated development". In the event that an approval is recommended for the Proposal, the approval bodies need to provide the Council with general terms of approval that are integrated into the development consent. This approach ensures that the subsequent approvals are consistent with the development consent and are not contradictory.

The need for referral to SEWPaC will be determined by further studies undertaken pre and post crushing activities if required.

7.3 LICENSING MATTERS RELATING TO THE SURVEY

NSW Department of Primary Industries (NSW I & I) Ethics Approval No 07/1601, NSW Scientific Research Licence 11194 & OEH Data Licence No CON99042 are held by OzArk staff.

8 OFFSETS

8.1 RELEVANT POLICY

There are three policies that need consideration with respect to offsets:

1. OEH Interim Policy for Biodiversity Offsets for Part 3A Projects (November 2010) (OEH Interim Part 3A Offset Policy).

2. DSEWPAC's Draft Policy Statement: Use of environmental offsets under the EPBC Act 1999 (DSEWPAC Draft Policy Statement).

3. OEH⁷ Principles for the use of biodiversity offsets in NSW ('OEH Offset Principles').

This Proposal is only relevant to '3' for the purposes of the SIS.

8.2 VEGETATION

OEH have requested that the Proposal should include offsets to replace the hollow bearing tree lost at a 1:100 ratio (100 hollows to be replaced).

Approximately 1.4ha of Box gum Woodland will be impacted (0.7ha occur as Disturbed Areas with low condition and 0.2ha is in moderate to good condition, the remaining 0.5ha has been cleared). This would be replaced at a 1:10 ratio as the Council proposes to establish a Biodiversity Offset Area of approximately 23ha (Figure 4). Further, the grassy woodland within the Project Site would be rehabilitated with winter flowering species. This would provide a 'maintain or improve' outcome for the Superb Parrot and other temperate woodland species.

The Biodiversity Offset Area comprises approximately 23ha within the Project Site, namely those sections of Lots 173 and 182, DP 750368 that would not be disturbed by the proposed expansion or the extraction area. This offset area is Box-gum Woodland, 11 known hollow-bearing trees and four sites of Aboriginal heritage significance. An additional 89 nest boxes suitable for the Superb Parrot would also be erected within the Biodiversity Offset Area. The Biodiversity Offset Area would be managed for conservation.

A further 2.5ha area of Box-gum Woodland within the adjoining road corridor (approximately 200m northwest of the Project Site) was proposed as an additional offset to meet the offset ratios proposed (see OzArk 2009). However, this portion of land did not meet the OEH or SEWPAC guidelines for biodiversity offsets because it could not be secured in perpetuity for biodiversity purposes and, as such, was abandoned. Notwithstanding, the habitat values within this adjoining parcel of land remain *in situ* and are unlikely to be significantly altered.

⁷ Formerly DECCW.

8.3 OE&H OFFSET PRINCIPLES

Biota requiring offsetting has not been identified and managed through the BioBanking Assessment Methodology.

OE&H state that a biodiversity offset is one or more appropriate actions that are put in place to counterbalance specific impacts on biodiversity. Appropriate actions are long-term management activities to improve biodiversity conservation. This can include legal protection of land to ensure security of management actions and remove threats.

Assessment of the Gospel Oak Quarry against the 13 OE&H Offset Principles is provided in **Table 4**. Proposed offsets inconsistent with the following NSW government's principles:

- Principle 4 Offsets will complement other government programs.
- Proposed offset is not afforded long term protection though land tenure adjacent to new national parks, nature reserves, state conservation areas and regional parks or incentives for private landholders.
- Principle 5 Offsets must be underpinned by sound ecological principles.

- The volume of requisite offsets has not been identified by using the BioBanking Assessment Methodology.
- Principle 7 Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.

- Proposed offsets are not afforded long term protection though land tenure. Commitments have been made to secure the offset in perpetuity, this would maintain the offset once the quarry is decommissioned.

Table 4: OEH Offset Principles

Principle	Consideration	Consistency
1 Impacts must be avoided first by using prevention and mitigation measures.	Offsets are then used to address biodiversity value or putting in place measures to prevent offset impacts.	Consistent. The continued operations of the quarry were designed to avoid remnant native vegetation where possible, i.e. resource extraction impact footprint has been modified to protect Superb Parrot Breeding hollows where possible. All infrastructure is placed in disturbed areas.
2 All regulatory requirements must be met.	Offsets cannot be used to satisfy approvals or assessments under other legislation, e.g. assessment requirements for Aboriginal heritage sites, pollution or other environmental impacts (unless specifically provided for by legislation or additional approvals).	Consistent. Assessment of the TGP under Part 5 of the EP&A Act would ensure all regulatory requirements are met.
3 Offsets must never reward ongoing poor performance.	Offset schemes should not encourage landholders to deliberately degrade or mismanage offset areas in order to increase the value from the offset.	Consistent. Project design demonstrates the Proponents ability to avoid and mitigate then offset.
4 Offsets will complement other government programs.	A range of tools is required to achieve the NSW Governments conservation objectives, including the establishment and management of new national parks, nature reserves, state conservation areas and regional parks and incentives for private landholders.	By increasing the area of occupancy of EECs and addressing KTPs, the offset package is consistent with NSW government programmes. Inconsistent. Proposed offset is not afforded long term protection though land tenure adjacent to new national parks, nature reserves, state conservation areas and regional parks or incentives for private landholders.
5 Offsets must be underpinned by sound ecological principles.	They must: - include the consideration of structure, function and compositional elements of biodiversity, including threatened species - enhance biodiversity at a range of scales - consider the conservation status of ecological communities - ensure the long-term viability and functionality of biodiversity. Biodiversity management actions, such as	Offsets aim (and have started to have results) to re-introduce, rehabilitate and revegetate the missing understory layers of the EEC, as well as increase the quality and ability to naturally recover of the extant EEC. The offsets would be managed through a LMP thus ensuring methodology. The volume of requisite offsets has not been identified by using the BioBanking Assessment Inconsistent.

Principle	Consideration	Consistency
	enhancement of existing habitat and securing and managing land of conservation value for biodiversity, can be suitable offsets. Reconstruction of ecological communities involves high risks and uncertainties for biodiversity outcomes and is generally less preferable than other management strategies, such as enhancing existing habitat.	long term viability of the proposal.
6 Offsets should aim to result in a net improvement in biodiversity over time.	Enhancement of biodiversity in offset areas should be equal to or greater than the loss in biodiversity from the impact site. Setting aside areas for biodiversity conservation without additional management or increased security is generally not sufficient to offset against the loss of biodiversity. Factors to consider include protection of existing biodiversity (removal of threats), time-lag effects, and the uncertainties and risks associated with actions such as revegetation. Offsets may include enhancing habitat, reconstructing habitat in strategic areas to link areas of conservation value, or increasing buffer zones around areas of conservation value and removal of threats by conservation agreements or reservation.	All comments in the row above are relevant for this principle. Consistent.
7 Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.	As impacts on biodiversity are likely to be permanent, the offset should also be permanent and secured by a conservation agreement or reservation and management for biodiversity. Where land is donated to a public authority or a private conservation organisation and managed as a biodiversity offset, it should be accompanied by resources for its management. Offsetting should only proceed if an appropriate legal mechanism or instrument is used to secure the required actions.	Proposed offsets are not afforded long term protection through land tenure. Commitments have been made to secure the offset in perpetuity, this would maintain the offset once the quarry is decommissioned. Inconsistent (Land tenure).
8 Offsets should be agreed prior to the impact occurring.	Offsets should minimise ecological risks from time-lags. The feasibility and in-	Proposed offsets are afforded long term protection through the Land Management Plan. Commitment to maintain the offsets once the quarry is decommissioned requires documentation. Consistent.

Principle	Consideration	Consistency
9 Offsets must be quantifiable - the impacts and benefits must be reliably estimated.	principle agreements to the necessary offset actions should be demonstrated prior to the approval of the impact. Legal commitments to the offset actions should be entered into prior to the commencement of works under approval.	The Proponent has agreed to the offsets stated in the EIS.
10 Offsets must be targeted.	Management actions must be deliverable and enforceable. • they protect land with high conservation significance • management actions have greater benefits for biodiversity • the offset areas are not isolated or fragmented • the management for biodiversity is in perpetuity (e.g. secured through a conservation agreement). Offsets will be of greater value where: • the area of impact • the types of ecological communities and habitat/species affected • connectivity with other areas of habitat/corridors • the condition of habitat • the conservation status and/or scarcity/rarity of ecological communities • management actions • level of security afforded to the offset site. The best available information/data should be used when assessing impacts of biodiversity loss and gains from offsets. Offsets will be of greater value where: • they protect land with high conservation significance • management actions have greater benefits for biodiversity • the offset areas are not isolated or fragmented • the management for biodiversity is in perpetuity (e.g. secured through a conservation agreement). Management actions must be deliverable and enforceable.	The details of the offsets have been reliably estimated through GIS software and several site visits. Consistent.
10 Offsets must be targeted.	They must offset impacts on the basis of like-for-like or better conservation outcome. Offsets should be targeted according to biodiversity priorities in the area, based on the conservation status of the ecological community, the presence of threatened species or their habitat, connectivity and the potential to enhance condition by management	Offsets are like for like at 1:16 ratio and would achieve a positive income for an EEC and a Threatened Species. Consistent.

Principle	Consideration	Consistency
	actions and the removal of threats. Only ecological communities that are equal or greater in conservation status to the type of ecological community lost can be used for offsets. One type of environmental benefit cannot be traded for another: for example, biodiversity offsets may also result in improvements in water quality or salinity but these benefits do not reduce the biodiversity offset requirements.	
11 Offsets must be located appropriately.	Wherever possible, offsets should be located in areas that have the same or similar ecological characteristics as the area affected by the development.	Consistent. Impacts would be offset in the immediate area on the same property.
12 Offsets must be supplementary.	They must be beyond existing requirements and not already funded under another scheme. Areas that have received incentive funds cannot be used for offsets. Existing protected areas on private land cannot be used for offsets unless additional security or management actions are implemented. Areas already managed by the government, such as national parks, flora reserves and public open space cannot be used as offsets.	Consistent. Proposed and existing offsets are supplementary and not already funded or have been funded or considered previously for funding. Although land tenure of the offset sites remains an issue the Proposal will see implementation of a LMP (management action). The existing and proposed offsets are located on private land.
13 Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.	Offsets must be audited to ensure that the actions have been carried out, and monitored to determine that the actions are leading to positive biodiversity outcomes.	Consistent. Assessment of this project under Part 5 of the EP&A Act and the OEH Offset Principles ensures all conditions of consent requirements are met.

8.4 EFFECTIVENESS OF OFFSETS

The offset provides for conservation and enhancement of 23ha of native vegetation, (all Box-gum Woodland EEC). Species used in revegetation will replace a missing structural layer (the ground layer and understory) and 'like for like' canopy species will be used, removal of sheep in the property to date has seen a return of the grassy habitat. Habitat values of trees to be removed (including erecting 89 next boxes) would be incorporated into the restored areas for habitat complexity. The result would increase the quality of the occupancy of the EEC impacted, as well as assisting in natural recovery of the ecosystem and the animals and plants that depend on them. This is particularly relevant to the local population of Superb Parrots. The offsets would see the

ability of the population to increase (by provision of more volume of breeding hollows and the quality of habitat through replacing structural complexity)...

A summary of the offsets has been provided below:

1. OE&H offset requirements for threatened species have not been achieved through habitat offsetting through BioBanking Methodology;
2. OE&H offset requirements for native vegetation (habitat) as the type, location and volume of offsets are consistent with 10 of the 13 Offset Principles (**Table 4**).

8.4.1 Vegetation Offset Management

Management of the Biodiversity Offset Area would be in accordance with the management measures proposed in the EIS, and would include the following.

- Fencing of the Biodiversity Offset Area and exclusion of stock (note stock exclusion was implemented in 2009);
- Implementation of regular weed and feral animal control programs;
- Implementation of a monitoring program to identify changes in the population of Superb Parrot within the offset area, and;
- A commitment to manage the Biodiversity Offset Area in the long term for nature conservation purposes.

8.5 NOISE AND DUST

Blasting and rock crushing would, where practicable, be scheduled outside of the breeding period for Superb Parrot. However, where blasting or rock crushing operations would be required during the breeding period, Council has committed to undertaking population surveys prior to and following the initial two blasting and rock crushing campaigns. Should those surveys indicate adverse impacts on the species as a result of the blasting or rock crushing operations, then those operations would cease immediately. However, should both surveys indicate no adverse impacts on the species, Council would continue to undertake those activities during the breeding period for the species.

Establishment of an earthen noise and visual bund wall on the eastern and/or southern portion of the quarry will reduce impacts associated with noise and dust within the Biodiversity Offset Area. The bund is a safety bund (around 1m to 2m high) around the perimeter. The bund is likely to be very large and probably ineffective for noise and dust however there is a proposal to plant a visual tree screen (having a minor noise and dust mitigation role), but this will take time to be established.

The potential for disturbance caused by the construction of bund walls can be managed by ensuring that it is not undertaken during the summer season when the Superb Parrot is likely to be breeding.

Dust suppression occurs within the existing Gospel Oak Quarry and takes the form of watering down roads, equipment, and the crushed rock itself. In reality, management of dust for OHS purposes will ensure no environmental impacts. Gospel Oak will only be operated intermittently and will only produce 50,000t/year. Quarries and mines with 10 and 100 times that production consistently operate with no dust-related impacts on vegetation immediately adjacent to the quarry.

The primary mitigation measure would be to continue to implement dust management strategies within all parts of the quarry. Dust from activities of quarrying itself and that generated by trucks on haul roads will require active suppression. This management will continue to be required throughout all stages of the proposed quarry development. Establishment of earth bunds and maintenance of a buffer zone between active quarrying activities and sensitive fauna habitats off-site (see above) will assist in the prevention of dust having negative impacts on these habitats. It may be necessary to curtail operations that cause high levels of air-borne dust during periods when strong wind might blow dust toward areas of managed native vegetation and this should be incorporated into the Dust Management Plan.

DESCRIPTION OF AMELIORATIVE MEASURES**9**

It is recommended that:

1. Blasting or rock crushing should preferentially be undertaken during the period 1 February to 31 August. This may require the Council to initiate fewer, larger blasts to ensure enough fragmented material is available during breeding season.

2. If blasting or rock crushing is required during the period 1 September to 31 January then an ecologist should be engaged prior to the event to determine whether breeding has commenced or is still ongoing. It should be noted that, the period of the breeding season will vary from year to year. If breeding is ongoing, the ecologist will be able to advise how much longer it is likely to continue and when blasting or rock crushing could recommence.

3. If blasting or rock crushing operations must be undertaken during the active breeding period, an ecologist should be engaged during the scheduled event to check whether the operations are having an adverse impact on the breeding activity of the Superb Parrot. This would include a pre-event population census a week before the event, a census whilst rock crushing or drilling for blasting is occurring, followed by a post-event census (two weeks later). The aim of the census would be to collect empirical evidence to determine the nature and extent of any impact to the population. The methodology and results for undertaking this would be reviewed by OEH prior to and after the event occurring.

- Details of the monitoring programme will be developed in-conjunction with OEH (Threatened Species Staff). The nature and extent of the programme would be approved by both Council and OEH prior to implementation.

4. Should the evidence conclude that there are no adverse impacts then a second inspection should be undertaken during a subsequent blasting or rock crushing campaign during the breeding season. If the result is the same then no further inspections would be recommended. However, OEH input regarding ongoing monitoring would be requisite.

5. In the event that either inspection indicates that blasting or rock crushing operations are having an adverse impact on Superb Parrot breeding then the Quarry and Biodiversity Management Plan should be amended to exclude blasting and rock crushing operations during the active breeding season.

6. Establish an earthen bund wall as described in Section 8.2.
7. Undertake noise and dust mitigation as per Section 8.2.
8. Manage the Biodiversity Offset Area as described within section 8.1.1.
9. The Council would prepare a Quarry and Biodiversity Management Plan providing detailing procedures for implementing the commitments made in the EIS and any conditional requirements.

10. The *Environmental Impact Statement* includes rehabilitation and management of the area, the flowing repeats and enhances this information:

- Tree planting with locally occurring species. The 2010 due diligence assessment noted that the environment is a good example of a 'grassy woodland and that tree planting *per se* should not be a core outcome. Notwithstanding Blakeys Red Gum (*Eucalyptus blakeyi*) has a higher potential to be used as a breeding site than other locally occurring species and as such should be preferentially plants on the 'flats' of the property surrounding the dam and adjacent to the main road;
- Replacing the shrub layer. Similar to the above. Maintenance of a grassy woodland environment is the core outcome, however, a screen of shrubs surrounding the property boundaries would be beneficial; particularly species likely to be used as fodder by the Superb Parrot, i.e. locally occurring acacia, especially *Acacia decora*—a winter flowering species;
- Fencing the Project Site and implementing sustainable grazing through an approved Grazing Management Plan. It is envisioned that only sporadic, crash grazing would occur at the end of winter to encourage regrowth in the spring;
- Erecting 89 nest boxes suited for the Superb Parrot in trees within the Project Site (outside the breeding period) and monitoring them to ensure invasion by feral bees does not occur. Individually number each box and have that on a site plan to manage the nest box population. Regularly monitor nest box use, ensure the Council's internal records can be used to inform OEH at any time in the future of Superb Parrot utilisation of the resource.
- Undertaking strategic weed control through a Weed Management Plan;
- Undertaking predator control on the property and attempting to undertake the action in conjunction with neighbouring properties;
- Identify Superb Parrot nesting hollows and create suitable buffers around them;
- Undertake the timing and nature of works to be sympathetic with breeding and chick rearing for the Superb Parrot, and;

- Preventing collection of firewood and deliberate dropping of dead trees within the Project Site.

10 CONCLUSION

This SIS reflects the dilemma of managing a known affect (direct habitat removal) with a possible affect (historical, current and proposed blasting, rock crushing etc). The first effect has been mitigated through a change in design of the quarry and securing environmental offsets. The second is diminished as the local Superb Parrot population obviously utilises an environment that has been quarried since 1953. Therefore operational affects for are considered to have a significantly lower probability to cause a long-term impact to the habituated local population than direct habitat removal.

Although mitigation has been applied to control possible operational affects in the EIS, there is, unfortunately, no evidence to confirm or deny if the affect actually occurs and if so, the nature and extent of its impact to the Project Sites *in situ* breeding population of Superb Parrots. Therefore, the issue remains unanswered as to whether operational affects impact the fecundity of the local population (the hypotheses).

There are three ways to manage the issue and two ways to test the hypothesis (i.e. does the activity affect the fecundity of the Superb Parrot local population):

1. By not approving the Proposal:

- This course of action would potentially result in a conservation outcome for the local population but would not offer conservation security or the other associated benefits of the offset package for the local population. In particular, should the land have no value for quarrying purposes, it could be used for agricultural purposes without further approval, with adverse impacts on ground cover and shrub species within the Project Site, and consequent indirect impacts on the Superb Parrot. As discussed in Section 6.2 of RWC (2010), refusal to grant development consent would also result in sterilisation of a valuable resource and significant additional costs associated with obtaining the road construction and maintenance materials from another location, with the associated detriment to Council's public works program. Additionally, refusal would not contribute to science given that the hypothesis would remain untested.

2. Approving the EIS after this hypothesis has been tested:

- The Proponent would face similar issues to those detailed above, namely temporary sterilisation of a valuable resource and consequent public detriment.

- By nature, testing the hypothesis would require an assessment of operational impacts to the local population; this can only if OEH approve continued operations in the quarry.

- This course of action would achieve a conservation outcome for the local population and contribute to science but may not deliver conservation security for the land or the associated offset benefits if the Council abandon the Project Site due to lack of security of the resource.

3. Approving the EIS ensuring testing the hypothesis as a condition of consent:

- This course of action would not impact the Proponent as it reflects the content of the EIS.

- Ongoing quarrying since 1953 has not resulted in the local extinction of a breeding population and, as such, the associated risks of it doing so with future, similar operations are considered 'low'. Securing environmental offsets as detailed in this document (consistent with 10 of the 13 OEH Offset Principles) will achieve a conservation outcome for the local population of Superb Parrots.

- If operation of the quarry must be undertaken during the breeding period then there is an automatic mechanism to test the hypothesis. Testing the hypothesis would contribute to science and thus be able to be applied elsewhere but more specifically for the conservation and management of the local population. This would contribute both to science and to regional conservation as well as offering security of the resource for the Proponent.

In summary, it is considered unlikely that direct or indirect effects would result in the local population of Superb Parrots at Gospel Oak Quarry becoming extinct but the long term effect of operational impacts needs to be tested. If this were to occur, management of the local population would be better informed as it would be based upon evidence rather than assumption. The evidence would then be used to justify the need for referral to SEWPAC.

11 REFERENCES

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- OZark 2009 Ecological survey of proposed 2.5 ha additional Offset for Gospel Oak Quarry, Cowra, NSW April 2009.
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- DECCW 2011 Department of Environment and Climate Change 2011 Threatened Species web site <http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10645>
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APPENDIX 1

CONTENT OF SPECIES IMPACT STATEMENT

Items	Section of SIS
1. A species impact statement must include a full description of the action proposed, including its nature, extent, location, timing and layout and, to the fullest extent reasonably practicable, the information referred to in this section.	Section 2.
2. A species impact statement must include the following information as to threatened species and populations:	Section 4
a) a general description of the threatened species or populations known or likely to be present in the area that is the subject of the action and in any area that is likely to be affected by the action,	Section 4.1.1
b) an assessment of which threatened species or populations known or likely to be present in the area are likely to be affected by the action,	Section 4.1.2 and Section 4.1.3
c) for each species or population likely to be affected, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or threat abatement plan applying to it,	Section 4.1.3 and Section 6
d) an estimate of the local and regional abundance of those species or populations,	Section 4.2.1
e) an assessment of whether those species or populations are adequately represented in conservation reserves (or other similar protected areas) in the region,	Section 4.2.1
(e1) an assessment of whether any of those species or populations is at the limit of its known distribution,	Section 4.2
f) a full description of the type, location, size and condition of the habitat (including critical habitat) of those species and populations and details of the distribution and condition of similar habitats in the region,	Section 4.2.2 and Section 3
g) a full assessment of the likely effect of the action on those species and populations, including, if possible, the quantitative effect of local populations in the cumulative effect in the region,	Section 5
h) a description of any feasible alternatives to the action that are likely to be of lesser effect and	Section 2.6

the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development,	
i) a full description and justification of the measures proposed to mitigate any adverse effect of the action on the species and populations, including a compilation (in a single section of the statement) of those measures,	Section 9
j) a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the species or population.	Section 7.2
3. A species impact statement must include the following information as to ecological communities: a) a general description of the ecological community present in the area that is the subject of the action and in any area that is likely to be affected by the action, b) for each ecological community present, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or any threat abatement plan applying to it, (b1) an assessment of whether those ecological communities are adequately represented in conservation reserves (or other similar protected areas) in the region, (b2) an assessment of whether any of those ecological communities is at the limit of its known distribution, c) a full description of the type, location, size and condition of the habitat of the ecological community and details of the distribution and condition of similar habitats in the region, d) a full assessment of the likely effect of the action on the ecological community, including, if possible, the quantitative effect of local populations in the cumulative effect in the region, e) a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development, f) a full description and justification of the measures proposed to mitigate any adverse effect of the action on the ecological community, including a compilation (in a single section of the statement) of those measures,	This section is not applicable.

g) a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the ecological community.	
4. A species impact statement must include details of the qualifications and experience in threatened species conservation of the person preparing the statement and of any other person who has conducted research or investigations relied on in preparing the statement.	Section 7.2
5. The requirements of subsections (2) and (3) in relation to information concerning the State-wide conservation status of any species or population, or any ecological community, are taken to be satisfied by the information in that regard supplied to the principal author of the species impact statement by the National Parks and Wildlife Service, which information that Service is by this subsection authorised and required to provide.	

