

key habitat areas is planned then a bat survey will be required to determine the extent of the bat populations on site.

Riparian and wetland areas

Amphibian species recorded included *Crinia signifera* (froglet), *Limnodynastes dumerili* (SCR) and *L. tasmaniensis* (SCR).

A number of common bird species were present, with the most important observation being a single record of Latham's snipe along South Para River.

Pest plants and animals

A total of sixty one (61) weed species were recorded during the survey comprising approximately 60% of the total floristic diversity recorded across the site. Of particular note is the abundance of Artichoke thistle (*Cynara cardunculus*) on the fringe of the *Eucalyptus porosa* woodland area and other sections of the site, where it is the dominant species (Refer Appendix B). Weed control of this species will be required to prevent further spread into the woodland area. African boxthorn (*Lycium ferocissimum*) and Olive (*Olea europaea*), both declared weeds in South Australia, were recorded in the woodland areas in varying infestations. The latter is particularly common in some sections of the site and some control of larger trees has been undertaken.

Weed diversity and dominance was reduced over summer with a lower range of annual species detectable, primarily due to the heavy grazing pressure by livestock. This grazing had eliminated most groundstorey vegetation, whether native or exotic, by January 2009 (see photographs in Appendix B).

European red fox (*Vulpes vulpes*), European rabbit (*Oryctolagus cuniculus*) and Brown hare (*Lepus capensis*) were recorded during the surveys. One adult fox, two cubs and fox scats, prints and runs were evident through the woodland areas and along riparian sites. Rabbit scats (as buck heaps) were present through much of the site and several large active warrens were noted. Brown hare occurred as individuals throughout the site. It is expected that feral cat (*Felis catus*) would also be present on site, although no evidence of the species was seen during the surveys.

Pest bird species recorded on site included Rock dove (*Columba livia*), Ringneck dove (*Streptopelia chinensis*), House sparrow (*Passer domesticus*) and Common starling (*Sturnus vulgaris*). All of these species were common and roosting in the quarry precinct. Several other species would be expected to occur. Common starling was present in flocks of several hundreds of birds during summer.

7 Conservation significance

National

No nationally listed plant communities are recorded or predicted to occur at the site. While the site is close to the edge of the distribution of the Irongrass grassland community, neither of the two species dominating the listed community was recorded on site.

A search of the Commonwealth Protected Matters database indicated that a number of resident and migratory species, or their habitat, may be present. The former category includes 2 plant species and 2 bird and 1 reptile species (or their habitat) of conservation significance may be present on site.

Silver daisy-bush (*Olearia pannosa* subsp. *pannosa*) and Pale leek orchid (*Prasophyllum pallidum*) are listed as vulnerable under the EPBC Act and are noted as likely to occur in the area. The initial site and subsequent surveys did not indicate that the required habitat was present to support either of these species in the site.

The Australian painted snipe (*Rostratula australis*) and Latham's snipe (*Gallinago hardwickii*) are known to inhabit a range of inland wetlands. Both species are cryptic and feed in shallow water or at the waters' edge and on mudflats, taking seeds and a range of invertebrates. Both prefer relatively dense grassland and sedgeland areas. All riparian and aquatic areas provide marginal to fair habitat for these species. The high numbers of fox identified in the area (and, probably, cats) would also mitigate against their long term occurrence.

Latham's snipe was recorded as one individual along the South Para River in December.

The Flinders Ranges worm-lizard (*Aprasia pseudopulchella*) is a cryptic species which occurs from the Flinders Ranges south to the western slopes and northern and central Mt Lofty Ranges (Cogger *et al.* 1993). It is listed as vulnerable under the EPBC Act but has no current formal listing at a State level. Subsequent to its listing under the EPBC Act, the species has been found a large number of new locations in the Mid North and it is considered to be widespread and secure in South Australia (M. Hutchinson, SA Museum, pers. comm., Aug. 2008).

The species has been observed in the northern suburbs of Adelaide, with eight individuals recorded during a 30 month survey of the Cobbler Creek Recreation Reserve in Salisbury (Mitchell 1992, Cogger *et al.* 1993). This species prefers open woodland, native tussock grassland, riparian habitats and rocky areas (Cogger *et al.* 1993). In some sites it appears to prefer stony areas or clay soils with a stony surface (Wilson and Knowles 1988; Cogger *et al.* 1993), but has also been recorded from sandy soils and has been found sheltering in soil beneath grassland clumps, stones, fallen timber and rotting stumps (Wilson and Knowles 1988).

This habitat is present in the site and, based on a single observation of the species in November 2008, it is considered to occur within the site. Its preferred habitat is around the rocky drainage line that occurs east to west through the property. The proposed fauna trapping program will be required to confirm its population numbers.

The type location of Pygmy bluetongue lizard (*Tiliqua adelaidensis*) is from the vicinity of Gawler East. Based on site observations, there are relatively few spider holes (which are the preferred refuge burrows for the bluetongue). Therefore, it is considered unlikely that the species still occurs here and there is a low risk for the project of its occurrence. Nonetheless, SA Museum staff will review the site and provide an opinion of the quality of the habitat available for the species and an initial investigation of spider burrows.

Other species of national significance which are migratory and which are likely to use the site or overfly it include Rainbow bee-eater, Fork-tailed swift and White-throated needletail. The former species was recorded on site and was present elsewhere in the region over summer, 2008/09.

Some other species of national significance originally occurred in or near the site, but these are now considered to be extinct, either in the State or the region. These include species such as Burrowing bettong, Southern brown bandicoot, Mallee fowl, Plains-wanderer, Spotted quail-thrush, Azure kingfisher and Regent honeyeater.

State

Neagle (1995) considered that Mallee box woodland was inadequately conserved in the State (as Priority 5), although DEH (2005) does not list this as a current priority target for conservation. Armstrong et al. (2003) consider that this woodland is still of particular conservation significance in the region. By observation, any example of mature woodland remaining in peri-urban areas is unusual and hence is biologically important.

River red gum woodland is considered to be adequately conserved in SA. Nonetheless, all areas of native vegetation are important regionally, especially in this region which has a relatively low remnancy of native vegetation and as part of regional migration corridors.

A search of the Biological Database of South Australia (BDSA) and State Herbarium on-line flora database did not provided records for any flora species of listed conservation significance for the site or adjacent areas. In addition, Councillor A. Shackley, Town of Gawler provided a list of observations and past records for flora and fauna species in the local area (P. Gatsios, email to KBR, 19 November 2008).

Three fauna species of conservation significance were recorded in the BDSA. The Regent honeyeater, which is endangered at a National and State level, was recorded as a breeding resident in the general region in 1906. The current Australian population of the Regent honeyeater is less than 1,500 birds and is continuing to decline (Birds Australia 2008). The species is considered to be extinct in South Australia and Western Victoria (Armstrong et al. 2003). No additional survey for this species is warranted.

Painted button-quail and Black-chinned honeyeater, which are listed as rare under State legislation, were observed near the site in 1996 and 1981 respectively. No other observations of the species have been recorded within the Biological Survey of South Australia. It is unlikely that these species are present on site, primarily due to the current limited amount of suitable habitat and increased number of predators such as European red fox and feral cats. Black-chinned honeyeater is probably extinct in the

northern Adelaide Plains (Turner 2001). There is a low risk that these species may be present. Based on observation, suitable habitat for both species is not present on the site.

Common brushtail possum (State rare) is a hollow-dependent species and is present along the woodland of the South Para River.

Brown toadlet (State rare) has been recorded near Gawler recently (A. Shackley, Nov. 2008). The species may still be present along some of the better quality riparian sites and grassland areas which are subject to inundation. Late summer to autumn surveys following average or above average rainfall would be required to detect the species.

Cunningham's skink may have occurred on the site in the past; however, the potential habitat available on the site is much drier than it prefers. It is considered very unlikely to occur here.

There is a large suite of other species which were originally present in the region and could still occur here, albeit as occasional migrants or visitors. All are considered as species with a relatively low risk of being present on the site as resident species or as regular migrants.

Species of particular significance include Brown quail, Jacky winter, Restless flycatcher, White-winged chough, Hooded robin, White-throated honeyeater and Elegant parrot. Other species which might still occur on the site for part of the year include Crested shrike-tit, Diamond firetail, Brown tree-creeper, Shining bronze-cuckoo, Peregrine falcon, Flame robin, Zebra finch, Southern free-tail bat, Western broad-nosed bat and Yellow-bellied sheathtail bat.

With the exception of Peregrine falcon, no recent sightings of these species have been made for the site, although there are recent records for some adjacent areas such as Parra Wirra, Sandy Creek and the Barossa Valley.

Wetland species, such as Musk duck, Blue-billed duck and Freckled duck, are considered very unlikely to use this site as primary habitat due to the lack of large areas of permanent water. However, these and other threatened aquatic species may occur in the riparian areas as visitors.

8 Recommendations

Due to the almost certain occurrence of the Flinders Ranges worm-lizard, recent records of Rainbow bee-eater and Latham's snipe (this study), plus potential habitat for Pygmy bluetongue lizard, this proposal will require Referral to the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) under the EPBC Act.

Although the report's findings are constrained by the poor seasonal conditions under which the assessment occurred and the severe impact of livestock heavy grazing, the areas of biological significance are apparent. These are areas of significance for both

flora and fauna as illustrated in Figure 1. It is likely that additional flora species of interest occur on site.

Preservation and improvement of the important habitat areas as part of any future use and development of the site would conserve the key areas of biological significance.

Vegetation and flora

Detailed mapping and appraisal of the understorey vegetation must be undertaken later in the year following the removal of livestock and preferably during a year with average or above average rainfall. Mapping to date has:

- defined the areas of good quality remnant native vegetation
- defined those areas of anthropogenic vegetation of little or no conservation value, including the larger areas of weeds infestations
- assessed the presence of some additional species of conservation significance.

These areas, which are also future target areas for additional surveys, are defined on Figure 1.

Once this additional assessment has been completed, then a final assessment of the areas to be set aside for conservation and potential areas implicated by clearing can be undertaken. The latter will be required in order to provide an understanding of legal obligations and compensation requirements under the Native Vegetation Act.

Detailed management requirements for aspects such as biodiversity linkages and corridors, pest species control, fencing to minimise 'people impacts' and revegetation would be included in planning requirements.

The central and northern areas of the site are within the jurisdiction of the Native Vegetation Council (NVC) and its Act. The NVC would be unlikely to approve clearance of the larger areas of Mallee box woodland (the overstorey of which is an intact community) and the areas of relatively intact understorey. Approval for clearance of other areas containing native vegetation and single trees is negotiable under an Application to Clear Native Vegetation providing it is undertaken under an agreed Plan and an agreed Significant Environmental Benefit (SEB).

Removal of significant trees would require Council approval under the Development Act.

Fauna habitat and species of particular conservation significance

Figure 1 defines areas of important habitat for all fauna groups. These are the same areas as defined for vegetation and flora.

Flinders Ranges worm-lizard

The rocky areas on site represent habitat for the nationally vulnerable Flinders Ranges worm-lizard (*Aprasia pseudopulchella*). Its preferred habitat is present on site, particularly in and around the rocky drainage line that runs east to west through the property. The potential for this species to occur within parts of the proposed development site is high. A fauna trapping and monitoring program is required to confirm its population.

Pygmy bluetongue lizard

Potential, though marginal and degraded grassland habitat for this species occurs on site in the areas of native grassland understorey.

Bird species

Rainbow bee-eater, Peregrine falcon, Elegant parrot and Red-capped robin have been recorded on the site in small numbers in 2008 by the current assessment. Improving the habitat for these species would be part of future development of the site.

The current population of the Regent honeyeater in all of eastern Australia is less than 1,500 birds (Birds Australia 2008). The species is considered to be extinct in South Australia and Western Victoria (Armstrong et al. 2003, Tait et al. 2005, SA Museum, pers. comm., July 2008). No additional survey for this species is warranted.

Painted Button Quail and Black-chinned honeyeater (listed as rare at a State level) have been recorded in or adjacent to the site in the past. It is unlikely that both of the species are present given the lack of suitable habitat and increased number of predators such as European red fox and feral cats. General observations for these species should continue to be made during future spring and early summer surveys.

Species of particular significance include Brown quail, Jacky winter, Restless flycatcher, White-winged chough, Hooded robin, White-throated honeyeater and Elegant parrot. Other species which might still occur on the site for part of the year include Crested shrike-tit, Diamond firetail, Brown tree-creeper, Shining bronze-cuckoo, Flame robin, Zebra finch, Southern free-tail bat, Western broad-nosed bat and Yellow-bellied sheath-tail bat.

Some of these species are seasonal or altitudinal migrants and a longer survey period under better conditions is required to detect them. No recent sightings of most of these species have been made for this part of the region, although there are recent records for some adjacent areas (R. Attwood, Birds Australia, pers. comm., December 2008). Habitat for most of these species is not available in the site.

Other fauna species

Species which occur, or may occur, in and adjacent to site include Common brushtail possum, Cunningham's skink, Brown toadlet, plus three species of bats. Trapping and observation for the worm-lizard will provide information about the presence of Cunningham's skink. However, there is no indication that this species is within the historical range of the species and the habitat is considered too dry for the species.

Common brushtail possum is present along the South Para River and Brown toadlet may occur here. An autumn survey is required to assess the latter species.

A bat survey would be required to determine the extent of the bat populations on site. However, it is anticipated that the species recorded in SA Museum (2006) would occur in the site and, providing that key habitats are conserved, a survey may not be required.

Other matters

At some stage, a Vegetation Management Plan (VMP) and a Construction Environmental Management Plan (CEMP) must be developed so as to guide the future development of the site. This would include the development of Significant Environmental Benefit requirements as off-sets for any native vegetation removed. Future conservation initiatives, especially habitat conservation and restoration, pest species management actions and revegetation guidelines should be included in these documents.

A range of conservation and open space initiatives could be developed for the site following ongoing surveys later in 2009. The latter assessments are required due to the below average rainfall in 2008 and the severe heavy grazing of the site during the current summer limiting the amount of seasonal variation information able to be ascertained for the site.

9 References

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Appendix A

**EPBC ACT PROTECTED
MATTERS SEARCH RESULTS**