Tony Blue

From: Kath Chesnut <Kathryn.Chesnut@ghd.com>
Sent: Wednesday, 27 August 2014 10:19 AM
To: tony@blueprintplanning.net.au
Cc: Ben Luffman; Rowena Hamer
Subject: Church Hill Quarry - ecology responses
Attachments: Church Hill_HBT data.xlsx; Church Hill mud map.pdf

Tony,

Please find below some further discussion regarding tree-hollows on the Church Hill quarry site following on from our phone conversation on Monday (25 August 2014).

From our general observations while on site, hollows were present in greater densities and larger sizes along the drainage lines and in nearby lower topographic areas rather than on the higher topographic areas and within the current development footprint. In particular, hollow-bearing trees were associated with the drainage line in the south-west of the study area as well as to the east approaching the dam to the east of the site. Vegetation in these areas appears to be less disturbed by historical fire and logging. However, vegetation along the western edge of the site is now quite influenced by the recent construction of the Pacific Highway Upgrade/Kempsey Bypass, which has resulted in a loss of connectivity with any vegetation to the west of the site, increased noise and vibration levels and weed infestation along the newly created edge adjoining the road.

As shown in Table 8 of our report, hollow-bearing trees recorded on the mid and upper slopes of the site (within vegetation types NR 268 and NR 247) were typically small in size (2-5 cm diameter) in small trees (average DBH 16-20 cm). Much of the vegetation within the study area appears to be relatively young (20-30 years old) regrowth, with larger, more mature age trees scattered throughout the mid-upper slopes and concentrated in gullies and lower topographic areas, as noted above.

Attached is the raw tree-hollow data as an excel file, and there is a quick summary table below. Quadrats 1, 2 and 7 are within the impact area. The other plots were outside the current impact area but were placed in areas that we considered to be characteristic of the vegetation types present as well as in areas of high biodiversity constraint such as in threatened ecological communities and along drainage lines. There are actually quite a few hollows in Quadrat 2, however as we discussed, they are generally lower quality as habitat for most hollow-dependent fauna: you can see from this that these quadrats typically have smaller trees and hollows than those elsewhere in the site, with the majority of these hollows only 2 or 3 cm in diameter.

Transect	Number of hollow bearing trees in each transect	Number of total hollows within each transect	Average diameter of hollows (cm)	Average tree DBH (cm)
1	1	1	5.00	20.00
2	4	5	3.75	18.75
3	2	2	20.00	47.50
4	2	8	4.00	60.00
5	2	2	7.50	30.00
6	0	0	-	-
7	3	3	2.33	16.67
8	2	2	7.50	20.00

As we discussed, areas around the drainage lines were included in the original proposal footprint surveyed during the field work, and given their ecological sensitivity (including presence of threatened ecological community

vegetation), we did focus a fair amount of survey effort on these areas compared to the rest of the site. Following our site visit, we requested that the proposal design be modified to exclude particularly sensitive areas including threatened ecological communities and drainage lines where trees appeared to be larger and older. Areas immediately surrounding the drainage lines appeared to have a greater diversity of age classes and hollow sizes, as well as greater habitat complexity in general, with more established and diverse mid- and understorey vegetation and more woody debris. The proposal was revised to exclude these areas and reduce the potential for impacts in subsequent design stages.

Although this has meant that the proposal now avoids the most ecologically sensitive areas of the site, it also means that much of the plot-transect data collected (5 of 8 plots) is now outside the area of impact. Our estimates of habitat loss (in particular estimates of 140 hollow-bearing trees to be removed) are therefore extrapolated from the data we have, and are likely to be skewed by this plot placement. In particular, our plots do not sample the area immediately surrounding the edge of the quarry, which includes patches of regrowth shrubs and small trees (such as *Acacia* and *Allocasuarina*) without a eucalypt canopy, which lacked the higher numbers of hollows evident elsewhere on site. There were still some hollows present in this vegetation, however they were of generally uniformly small size and occurred in smaller trees, compared to elsewhere on site such as within the drainage lines where a greater diversity of hollow sizes were present in larger trees.

As discussed above, the vegetation to be cleared has lower numbers of hollow-bearing trees than might be expected in a less disturbed, older age vegetation remnant. Despite this, the proposal would still result in the clearance of hollow-bearing trees from the site, which will reduce the hollow resource for native fauna in the area.

The reasons that this removal was not regarded as likely to result in a significant impact on any local populations of threatened fauna were:

- The majority of hollows observed within the area of impact were small (<5 cm diameter, mostly 2-3 cm diameter) in small trees typically less than 20 cm DBH. These size constraints would limit their suitability for many native fauna.
    - The Brush-tailed Phascogale in particular is identified by OEH as preferring rough-barked trees with a DBH or 25 cm or greater, however may use hollows with entrances 2.5-4 cm wide with a large chamber inside, and is known to use many different hollows over a short time span. Given that many of the trees to be impacted by the proposal are smaller than the DBH preferred by the species, the quality of the habitat, irrelevant of the presence of hollows, is likely to be lower than in an older-aged stand of vegetation that has not been exposed to the disturbances evident on site.
- The disturbed nature of the site. As we discussed on the phone, the study area is located at the northern edge of a larger patch of habitat. The Kempsey Bypass is located immediately to the west and Crescent Head Road to the north, and there are several properties nearby that have unrestrained dogs which may deter the use of the site by native fauna. In addition, cleared and partially cleared land to the north and east would form a barrier to fauna movement for the majority of arboreal or terrestrial species, however bids and bats may still traverse the gap. The bypass in particular has reduced the value of habitats within the study area, with significant noise, light and vibration disturbance evident, particularly in the south-west of the site. In addition, as discussed above and in the report, the areas to be impacted have been previously disturbed by logging and regular (perhaps too regular) fire and have lower habitat complexity than areas along the drainage lines, or than areas of contiguous habitat to the south of the study area.
- The presence of extensive areas of higher quality habitats elsewhere in the locality (e.g. to the south and east in Maria River National Park, which is contiguous with vegetation in the study area), which are more protected or sheltered from the noise, light and vibration impacts associated with the Kempsey Bypass, and which are further removed from disturbances associated with residential properties that have dogs and other domestic animals. It is our belief that since the Bypass was constructed, that the site (and in particular the western edge) has decreased quite substantially in terms of habitat quality, and that many of the species which may have once utilised habitats present prior to the construction of the Bypass may have dispersed elsewhere in the locality if they are still present.
- The disturbed nature of the vegetation to be cleared, which as outlined above and in the report, shows signs of frequent fire events, the influence of edge effects such as weed establishment, light and noise

disturbance, fragmentation as a result of the construction of the Bypass and the presence of surrounding residences with domestic animals such as dogs which may deter native species from using the site. We also noted a number of signs of large dogs throughout the site during the field survey (ie dog droppings) suggesting that the site is accessed relatively regularly by either wild or domestic dogs.

- Threatened fauna which may be using these smaller tree hollows (e.g. the Phascogale and hollow-roosting microbats) are all mobile with large home ranges and individuals are known to use multiple roosts. With regards to the Phascogale, based on the home range of this species (from 20-40 ha for females and up to 100 ha for males, see Section 5.6.3 of the report), the area to be impacted could represent part of the home range of several overlapping individuals or family groups but would be unlikely to represent the whole of an individual's home range.
- Taking into account the above, the proposal is considered unlikely to affect a large proportion of any local populations of threatened native fauna that may use resources within the site on a permanent, seasonal or temporary basis.

While impacts resulting from the proposal were not considered likely to result in a significant impact on any threatened fauna species, it was also recognised that these potential impacts were not insubstantial. For these reasons, the following mitigation measures were proposed:

- Comprehensive pre-clearing surveys to accurately determine the number, types and sizes of hollows that would be removed. Based on this information, an appropriate number and range of nest-boxes would be installed in suitable retained habitats elsewhere on site (or as discussed, in adjoining properties or the offset site) prior to clearing being undertaken.
- Implementation of a tree-dwelling fauna management protocol in order to minimise injury or mortality to individuals roosting within the proposal site

As requested, also included with this email is a mud map showing the approximate location of the stands of trees that had higher numbers of hollows, as well as the approximate locations of nearby residences with dogs, and areas where the noise from the Bypass is particularly pronounced, in an attempt to illustrate further the lower quality of habitat present on both the wider site as well as within the proposed construction area.

Happy to discuss further if needed, please contact me if you need any more information,

Kind regards,

Kath Chesnut
Ecologist

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