enviro-dynamics
environmental solutions for a changing world

Helicopter Eagle Nest Survey

Proposed Guildford Windfarm Site

North West Tasmania

Epuron Projects Pty Ltd.

3rd June 2020 (v1.1)

Enviro Dynamics | Josie 0427 044 700 | Andy 0400 151 205 | 2 Edward Street, Glebe, TAS 7000 |
info@enviro-dynamics.com.au | www.enviro-dynamics.com.au

Table of Contents

List of Figures

List of Tables

1. Introduction

This report provides a detailed overview of the information gained from a survey undertaken by helicopter on the 25th of May 2020 for nests of wedge-tailed eagles (*Aquila audax*) and white-bellied sea-eagles (*Haliaeetus leucogaster*). The survey was conducted by Enviro-dynamics on behalf of Epuron Projects Pty Ltd., to fulfill a notice of intent to the Tasmanian Environmental Protection Agency (EPA) for a proposed windfarm site termed Guildford in the north west of Tasmania. The survey covered a total area of approximately 18,000 ha, encompassing a minimum 1km buffer search area around each proposed wind turbine site and nearby surrounding areas mapped as potential nesting habitat (Figure 1). The nests were located to enable planning for a separation of proposed turbine sites from recorded nests. The information also provides an opportunity to monitor the productivity of those nests.

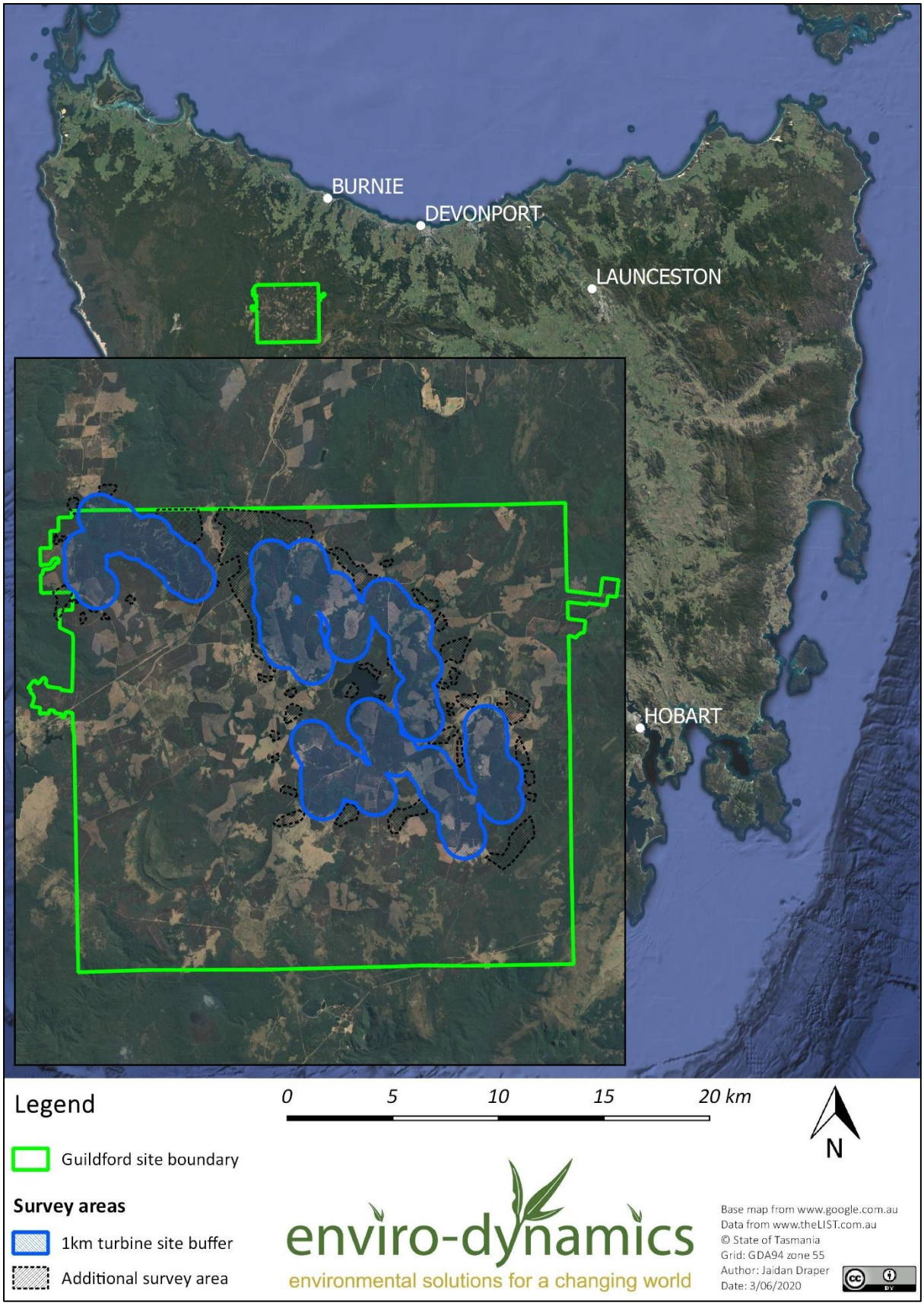

Figure 1 - Map showing the location and extent of the areas surveyed.

2. Methods

2.1 General

The helicopter survey was conducted throughout designated 1 km turbine site buffer search areas to identify any new eagle nests and check known nest sites (as recorded on Tasmania's Natural Values Atlas (NVA)), in accordance with standard procedures that are well established in Tasmania. The survey techniques used involved slow flying (at about 10kts) through and about 25m above the canopy of potential nesting habitat, with occasional hovering and faster, higher transits of exposed areas to other areas of suitable habitat. In homogeneous habitat parallel transects were flown 50-100m apart depending on forest density (and consequent ease of searching). In denser habitat, transects were closer and flights slower to ensure adequate coverage of the forest canopy (refer to Appendix 1 - Flight Path Map for an overview of the transects). In tall forest, various flight altitudes were used (some much lower than canopy height) to obtain good views of trees. Copses of even a few mature trees were also checked, particularly if located in suitable sheltered sites. The focus of this survey was thoroughness, so even marginal potential sites outside of and in between the 1 km turbine site buffer areas were checked.

The surveys were conducted with an Aerospatial Squirrel (B3) helicopter (and carried out between 8 am and 3 pm on the 25th of May, 2020). A pilot experienced with eagle nest searches (Steven Kroon from Tasmanian Helicopters) was used, with a highly experienced principal observer Nick J Mooney (NJM) in the front left passenger seat and a secondary observer/navigator in the pilot side rear passenger seat (Jaidan Draper). All crew and passengers had intercom, that was used freely to navigate throughout the search areas and relay requests to the pilot (e.g. for closer examination of particular trees).

Built up rural and residential areas were avoided during low level transit and isolated houses were skirted. Any stock that appeared to move in response to the helicopter or people that were focused on the helicopter were avoided. If any eagles moved directly toward the helicopter the helicopter moved away, with the intent to try and resurvey that area later. These are standard low-level actions of commercial helicopters doing such surveys.

Any eagles seen throughout the site during the survey was recorded, as were grey goshawks (*Accipiter novaehollandiae)*.

2.2 Adjacent Potential Nesting Habitat

Polygons of the most likely nesting habitat were constructed from the Wedge-tailed Eagle Nesting Habitat Model provided by Forest Practices Authority (FPA), to guide searching of areas outside of the proposed 1 km turbine site buffers. When new nests were found within the buffers, additional nest surveys were conducted up to 2 km outside of but adjacent to the areas to identify suitable nest-free areas for potential relocation of turbine siting. Additional patches of what appeared to be potential nesting habitat were also identified by the principle observer during searching and these were also checked. Conversely some areas identified as potential nesting habitat by modelling proved to be inaccurate, so when clearly unsuitable (i.e. regrowth plantation) these areas were not closely searched.

2.3 NVA and other known nest records

The location of all known eagle nests within the site and nearby areas were briefly checked to confirm the presence or absence of those nests. Close photographs were not taken to minimise disturbance (some of these nests had been visited by a helicopter several times over the past year according to records of earlier surveys and the pilot). The presence and condition of known nest sites were also assessed by the principal observer through 10X42 binoculars and the physical condition was classed as Prime, Viable, Derelict or Remnant (see Table 1 below). If the nest could not be located, a circular search pattern was undertaken to a distance of about 100m from the nest coordinates and the site photographed. The NVA was the prime source of information for known nests but several records were also identified from Forico's private forestry data base (Forico being the private forestry owner of most land searched).

2.4 New Nests

When a new nest was found by the observers the location (using both a Garmin hand-held GPS and G-STAR IV plug-in GPS receiver) was taken together with a bearing and the estimated distance to the nest. Several photos were also taken by a Sony Alpha 6000 camera with 55-210mm lens attached (refer to Appendix 2 - Survey Photographs). The site was then vacated. Hovering over or very close to nests was avoided to reduce disturbance of the nests. The principal observer also made a judgment as to whether wedge-tailed eagles or white-bellied sea eagles had likely built the nest and classified its physical condition (as per Table 1).

The location, status and photos of all new nests were submitted to the NVA in the week following the survey. Results of visits to known nest sites (e.g. whether it was located and if so its status) were also supplied to the NVA.

2.5 Nest Status

The status of all nests found were classified by the principal observer (Tables 2 and 3) based on the physical characteristics observed (Table 1). The intention of using this classification system was to identify nests most likely to be used within the next few years.

Table 1 - Classification and status of nests – *Nests are classified based on their physical appearance. 'Active', means the birds at least produce an egg there or show every intention of that (nest lined with leaves and bark, droppings, adult eagles present) by mid-October (activity survey time).*

Nest Status	Description
Prime	Brown, flat or cupped top with remnants of leaves and bark on top; *likely to be active within 2 years*
Viable	No signs of use for 2-3 years (limits of assessment by the survey) but robust and flat or only slightly rounded on top; *could well be active within 5 years*
Derelict	Slumped or heavily rounded, bleached on top and nest core may be visible as 'compost'; *unlikely to be active unless drastic local habitat changes (forces reoccupation).*
Remnant	Few sticks remaining, nest core may be visible as 'compost', chaotic structure; *very unlikely to be active*.

3. Results

A total of three new nests were found, while six known nest sites were visited over a wide distribution (Figure 2) with only five nests being found throughout the proposed Guildford windfarm site (Tables 2 and 3). All new nest sites were all recorded within the south-eastern portion of site along the edges of remnant copses in mature eucalyptus trees. Nest numbers 1 and 2 (our numbers given) were found on the boundary of and within the 1 km proposed wind turbine site buffers, while nest 3 was found in between separate buffer areas. The new nest sightings consisted of the principal observer finding two of the three new nests and the secondary observer one. All of the new nests found were described by the principal observer as highly likely being built by wedge-tailed eagles.

Five known nests were confirmed as present, with three in the central portion of the site and two in the central northern portion, these are all located outside of the buffer areas. The one known nest site from old NVA records located north east of Talbots Lagoon in the central portion of the site was not found, this area was mostly forestry plantation and myrtle forest with limited individual dead eucalyptus trees scattered throughout (Figure 3). The nest site looked most unlikely to have a nest according to the principal observer.

Table 2 - New Nests - *Information regarding the date, location, description, classification and photo number (refers to Figures in Appendix 2) of each new nest encountered during the survey.*

Date surveyed	Nest no.	Coordinates: GDA 94/MGA Zone 55	Comments	Classification	Photo no. (Figure)
25/05/20	1	399347E, 5408925N	Robust medium sized nest, flat top with large sticks that may last long into the future.	Derelict	5
25/05/20	2	399871E, 5408241N	Small robust slightly rounded nest. No new sticks, with slight bleaching below.	Viable	6 & 7
25/05/20	3	396624E, 5406697N	Large robust nest, flat top and brown. Prominent bleaching below.	Prime	8 & 9

Table 3 – Known nests - *Information regarding the date, location, description and classification of each known nest encountered during the survey (NVA number refers to the nest identification number* recorded in the Natural Values Atlas database).

Date surveyed	NVA nest no.	Coordinates: GDA 94/MGA Zone 55	Comments	Classification
25/05/20	2256	390818E, 5410778N	Medium sized flat nest in good condition, with slight bleaching below.	Viable
25/05/20	92	391301E, 5411355N	Small flat nest, with no new sticks present. One side slumping.	Derelict
25/05/20	2708	393962E, 5412278N	Large slumping nest in an old dead eucalyptus tree. No new sticks present.	Derelict
25/05/20	1363	389284E, 5415756N	Robust nest bleached around edges but some brown on top	Viable
25/05/20	2673	390535E, 5419872N	Flat nest in good condition with few very small epiphytes growing on top.	Prime

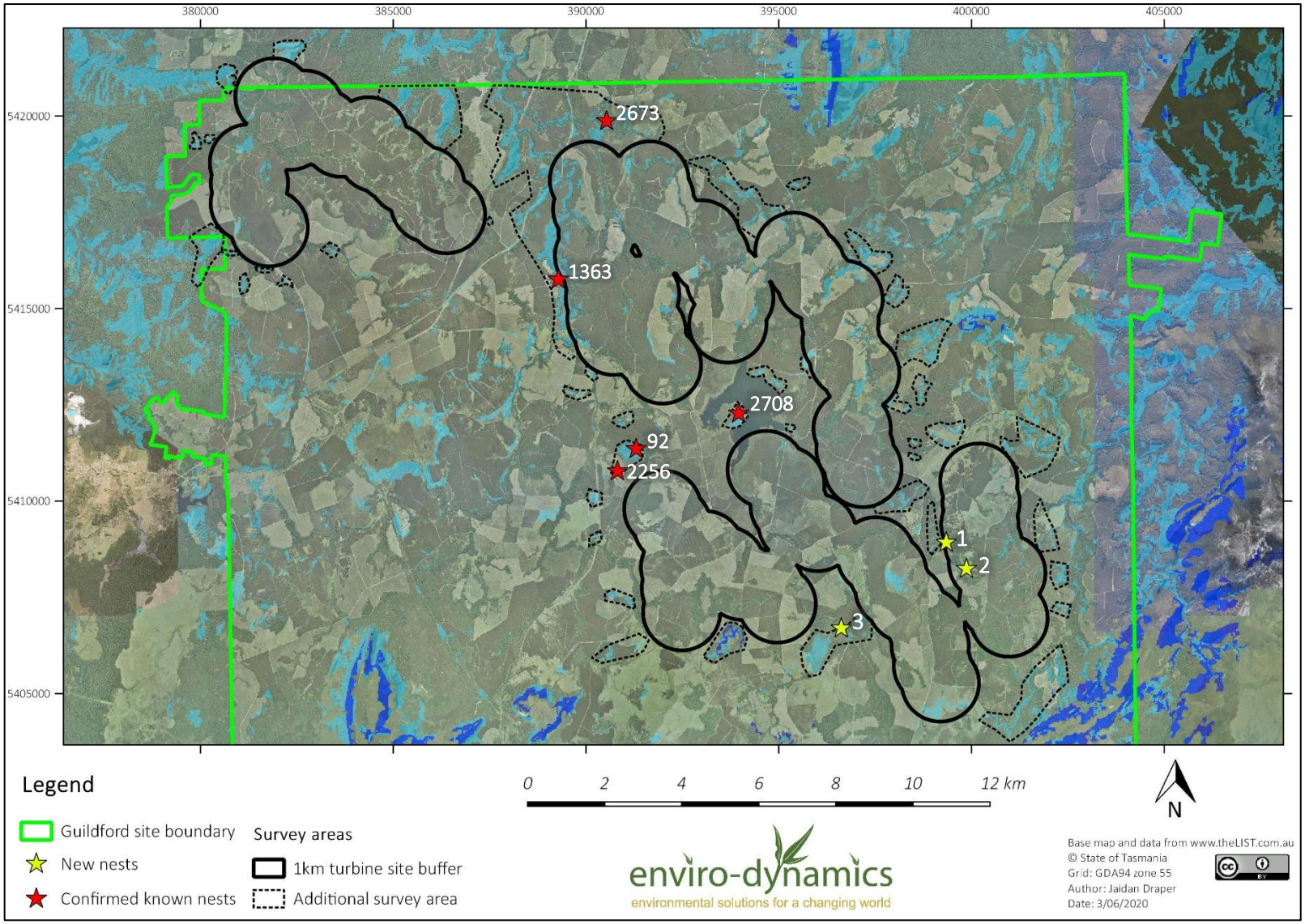

Figure 2 - Eagle nests surveyed throughout the Guildford site (Blue shading indicates potential nesting habitat; light = low elevation, dark = high elevation).

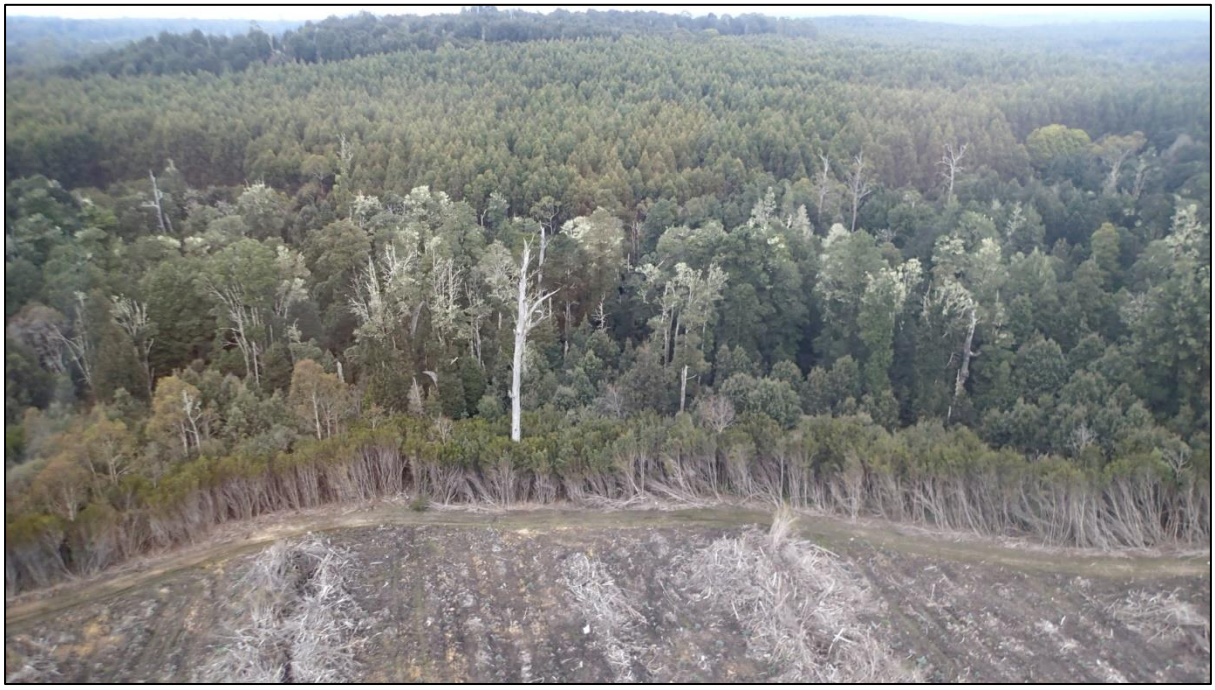

Figure 3 - Site and surrounds of known nest site from old NVA records at the Guildford site.

3.1 Eagle sightings

Ten adult wedge-tailed eagles (identified as adult by their dark plumage) were seen throughout the day usually in pairs, while no immature wedge-tailed eagle were observed. In addition, two grey goshawks were seen perched in trees within the site boundary.

4. Discussion

All eagle nests found were determined to be likely built by wedge-tailed eagles. The current use of eagle nests by a particular species has little consequence on which species will consistently use a nest as there is much cross over in the use of some nests at different times (e.g. Mooney & Holdsworth, 1991; Threatened Species Section, 2006). Importantly, wedge-tailed eagles might use any of these nest sites. The numbers of new nests found was lower than expected. Before the survey, based on habitat distribution throughout the site the principal observer estimated 5-10 nests would be found based on modelled habitat extent and distribution throughout and adjacent to the site but only three new nests were found. These results may reflect that considerable amounts of area modelled as suitable for nesting were in reality unsuitable. In addition, the large areas of dense plantations are likely of poor suitability for hunting by eagles and nests may be placed away from these sites if suitable nesting habitat is available. Most new nest sites were found in copses that overlooked sparser (usually younger)

plantations, which may reflect better foraging opportunities (i.e. access to the ground). It would be instructive to know which of the new and known nests are actually used for breeding. It may be that the proposed Guildford windfarm site is dynamic, as areas that come in and out of foraging suitability are directly related with forest regrowth age and density changes (young less dense plantations likely provide better foraging opportunities).

A low percentage of the 18,000ha area surveyed represented good potential eagle nesting habitat (Brown & Mooney, 1997), mostly in the form of clumps and strips of native vegetation containing mature eucalypt trees. The territorial nature of eagles results in active nests being widely distributed, usually at least 4km apart. Therefore, a large clump/strip of good nesting habitat can only hold one or (if very extensive allowing sufficient separation) two active nests. Consequently, where most potential nesting habitat is in a few clumps there may be poor distribution of good nesting opportunities (other apparent nesting opportunities that are adjacent may be in sub-optimal situations through poor shelter, high human disturbance and/or few if any suitably robust eucalypt trees). The apparent refusal by eagles to use myrtle (*Nothafagus cunninghamii*) for breeding despite it sometimes being the only large, sheltered trees available in large areas is perplexing – as yet no nest records exist in this species. Clusters of nests do occur within the Guildford site, but that seems to be more a reflection of past disturbance from people resulting in moves by eagles (Mooney and Holdsworth 1991, Mooney 2005, Threatened Species Section 2006).

The number and distribution of eagles seen during each survey day seemed to largely reflect the density of nests in those areas (itself probably reflecting foraging opportunities), suggesting 2-4 pairs (territories) for the Guilford windfarm section and 1-3 pairs (territories) for the Hellyer site which was surveyed immediately after Guildford. Of particular note, was the low ratio of adults to juveniles visually observed, likely reflecting relative detectability (based on a life table there should be similar numbers of adults and immatures, NJM). At the survey time of year adults are starting to declare territory ownership and are perching on obvious 'lookouts' or soaring; they are being overt. This compares with immatures being covert, usually perching along forest edges or in the canopy presumably to avoid conflict with adults (differences in behaviour from concurrent road surveys, NJM).

Helicopter surveys as carried out in the habitats considered, is thought to have a detectability of nests of 90-95% considering nests that are found shortly afterwards by logging or other activities (NJM pers obs, J. Wiersma FPA pers comm). Therefore, it is unlikely other nests exist in the searched areas.

5. Bibliography

Anon, 2015. Fauna Technical Note No. 1: Eagle nest searching, activity checking and nest management. FPA, Hobart.

Brown, W. & N. Mooney, 1997. Modelling of the nesting habitat of the wedge-tailed eagle. PWS report to the RFA.

Mooney, N. & M. Holdsworth, 1991. The effects of disturbance on nesting Wedge-tailed Eagles in Tasmania. *Tasforests* 3, pp 25-33.

Mooney, N., 2005. Report to the federal court of Australia by a "Court Appointed Expert". In: *Proceedings of TAD 17 of 2005, Brown versus Forestry Tasmania*.

Threatened Species Section, 2006. *Threatened Tasmanian Eagles Recovery Plan 2006-2010*. Department of Primary Industries and Water, Hobart.

Appendix 1 - Flight Path Map

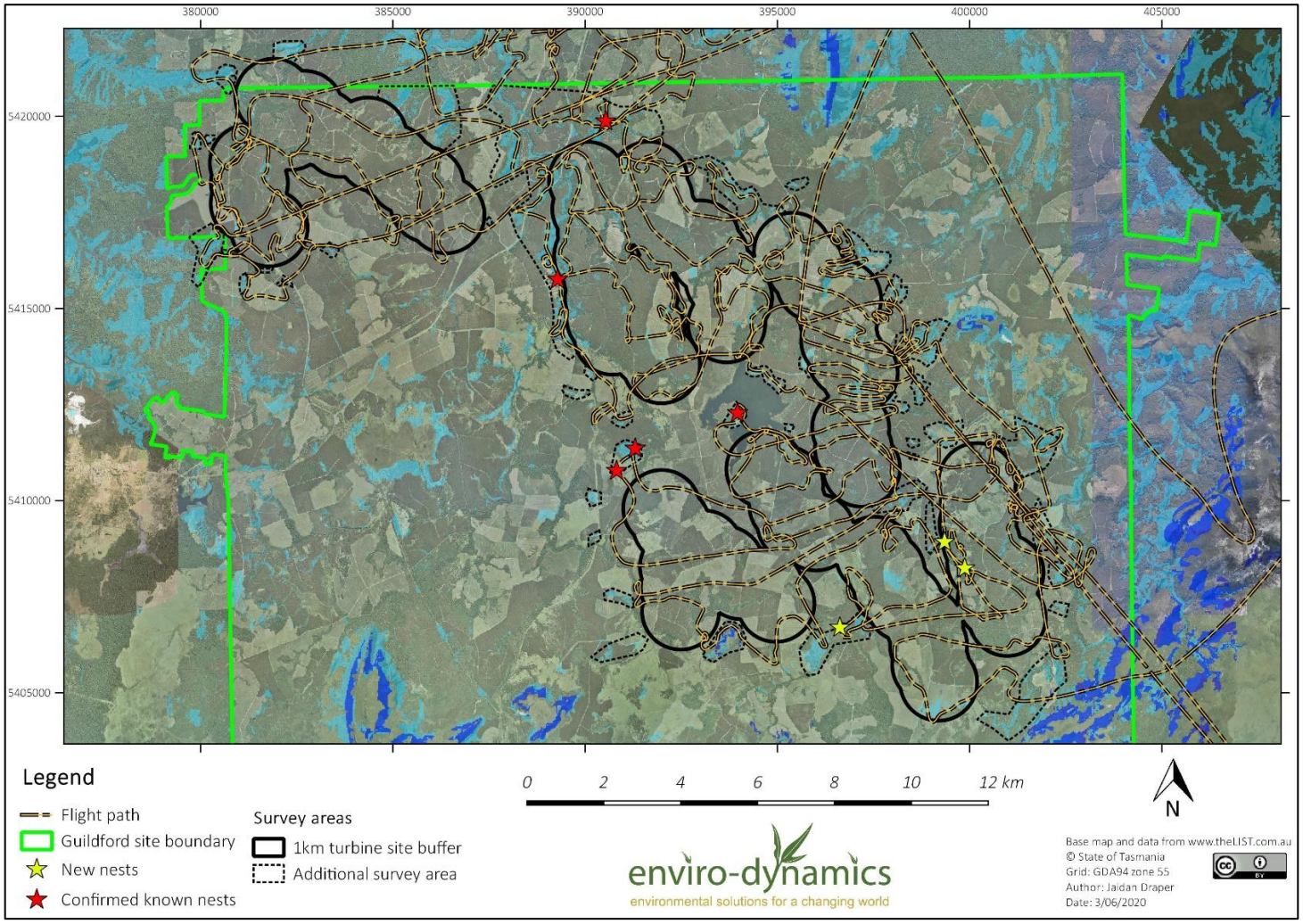

Figure 4 - Map showing the flight paths taken during the survey throughout the Guildford site.

Appendix 2: Photographs of new nests found during survey

Figure 5 - 1st new nest found on 25/05/20 (no. 1).

Figure 6 – 2nd new nest found on 25/05/20 (no. 2).

Figure 7 - 2nd new nest found on 25/05/20 (no. 2).

Figure 8 - 3rd new nest found on 25/05/20 (no. 3).

Figure 9 - 3rd new nest found on 25/05/20 (no. 3).