ANU enterprise

19th June 2020

Executive summary

- The Subject Site is mapped as important habitat for Swift Parrots.
- The Subject Site lies within an important and regularly-used wintering area for Swift Parrots.
- The future importance of the area within and surrounding the Subject Site as a drought refuge for Swift Parrots is likely to increase given climate change projections.
- Given the number of lorikeets I observed foraging on profuse spotted gum blossom within the Subject Site during inspection, I disagree with the AEP conclusion that habitat within the Subject Site is marginal Swift Parrot habitat.
- A lack of records of Swift Parrot on the Subject Site and their suggested preference for other areas in the region are likely explained by spatial biases in observer effort, rather than true absences / preferences for other areas.
- Distinctions in the quality of the habitat within the Subject Site are not relevant for Swift Parrots, because the distinctions are based on understorey attributes whereas Swift Parrots almost exclusively use the canopy for foraging.
- Available data do not support the conclusion that Swift Parrots prefer swamp mahogany and forest red gum over spotted gum in the Central Coast.
- The importance of the Subject Site to Swift Parrots does not currently acknowledge the cumulative risk of the loss of similar patches of habitat in the area if a precedent is set.
- The Subject Site is not mapped as Regent Honeyeater breeding habitat, but does contains key tree species for Regent Honeyeater foraging.
- The proposal does not satisfactorily avoid potential serious and irreversible impacts to Swift Parrots or Regent Honeyeaters (assessment step 3), because it has not considered construction in a different location that is not mapped as important habitat for either species.
- In my opinion, the proposed loss of habitat on the Subject Site would represent a serious and irreversible impact for the Swift Parrot.
- The potential for a serious and irreversible impact on Regent Honeyeaters and the need for species credits should be explored.

Contents:

Part 1: Background

ANU Enterprise was engaged by Central Coast Council to undertake an expert peer review of the Biodiversity Development Assessment Report (BDAR) produced by Anderson Environment and Planning (AEP) for the proposed development of 125 and 135 Johns Road and 95 Murrawal Road, Wadalba, NSW. Specifically, ANUE were asked to provide expert opinion on:

- Determining how important the proposed development site is in providing feeding habitat for the Swift Parrot and if removed, the likely impact it may have on the local resources available to the Swift Parrot.
- Review of Section 10.2.3 of the NSW Biodiversity Assessment Method, clause 6.7 of the Biodiversity Regulation 2017 and the DPIE SAII Guidelines to determine what level of impact is likely to represent a Serious and Irreversible Impact (SAII) for the Swift Parrot.
- Review of Section 2.3.1 of the AEP BDAR to determine if the assessment made against Section 10.2.3 of the BAM is accurate.
- Determine if in their opinion that an SAII is or is not likely to occur.
- Determining how important the proposed development site is in providing feeding habitat for the Regent Honeyeater and if removed, the likely impact it may have on the local resources available to the Regent Honeyeater.

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Part 2: Importance of the site for swift parrot foraging and likely impact on local Swift Parrot resources.

I visited the site on 15th May 2020. *Corymbia maculata* were flowering profusely at the time and the site contained well over 200 musk lorikeets and 50+ rainbow lorikeets. See videos supplied with this document. Given these large numbers of nectarivirous parrots present on the Subject Site, I consider the Subject Site clearly represents potential Swift Parrot foraging habitat and is not as marginal as the BDAR suggests. I located 2 Swift Parrots the previous day in spotted gum forest approximately 2km from the site. Given these conditions, with sufficient survey effort during the flowering period, it is possible that Swift parrots may be detected occupying the Subject Site.

Figure 1: Example spotted gum forest within the Subject Site proposed to be cleared.

Spotted gum-ironbark forest is a key habitat for Swift Parrots, particularly during drought periods (Saunders & Heinsohn 2008). The Central Coasts represents a key wintering area for Swift Parrots and birds are detected in the area in most years. The importance of coastal habitats to wintering swift parrots is likely to increase in the future, given climate change predictions (Saunders & Heinsohn 2008). The site is mapped as an important area for the Swift Parrot, as acknowledged in the BDAR. The loss of any mapped important habitat will decrease the availability of local foraging resources for Swift Parrots in an area the species is known to occur regularly. The Central Coast is a key management site for implementing conservation actions to facilitate Swift Parrot population recovery under the Saving our Species (SoS) initiative (NSW government 2020).

The proposed clearance of approximately 5.9 ha of a vegetation community with which the Swift Parrot is strongly associated with appears at odds with 3 of 11 SoS objectives for Swift Parrot conservation on the Central Coast (NSW DPIE):

1) *Improve and maintain connectivity and extent of available habitat.*

2) *Restore or supplement habitat or habitat features.*

3) *Improve and maintain connectivity and extent of available habitat.*

For nomadic resource specialists such as the Swift Parrot, the impact of the loss of small patches of potential foraging habitat should not be viewed in isolation. This is because:

1) Only a small proportion of potential habitat will represent viable foraging habitat (i.e. bloossom or lerp) in a given time (Webb *et al.* 2017). If viable foraging habitat is lost, it could have disproportionate impacts on nomadic species that may depend on them at that time (Runge et al. 2014).

2) The threat of the cumulative impact of sequential loss of similar small patches of foraging habitat e.g Reside *et al.* (2019).

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Section 3: The level of impact that is likely to represent a serious and irreversible impact for the Swift Parrot

The level of impact that is likely to represent a serious and irreversible impact is quite subjective. To minimise subjectivity, I recommend using the precautionary principle to consider the loss of any mapped important habitat to potentially represent a serious and irreversible impact for the Swift Parrot.

The level of impact defined above is justified because quantifying a serious and irreversible impact also requires 'avoidance.' In my opinion, the proposed development has not done everything possible to avoid potential impacts on Swift Parrot habitat by identifying other potential development areas that are not mapped as important habitat.

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Section 4: Review of section 2.3.1 of the AEP BDAR

Text in section 2.3.1 of the BDAR states the following:

*The Swift Parrot and Regent Honeyeater are listed as a dual credit species, occurring as an ecosystem credit species when foraging habitat is present, and a species credit species and potential candidate Serious and Irreversible Impacts (SAII) species when breeding habitat is present. Breeding habitat is determined by 'mapped important areas' as stated in the BioNet Atlas, however this mapping is yet to be published by OEH. In order to determine whether the Subject Site falls within these mapped important areas, AEP enquired if the development site fell within draft areas. Correspondence was received from BAM Support Team on the 2 December 2019 stating that the Subject Site does not fall within any mapped important areas for Regent Honeyeater, but does contain draft mapped important areas for Swift Parrot (see **Figure 6**). Assessments have been conducted for Swift Parrot against provisions of Section 10.2.3 of the BAM (**Table 16**), and a habitat assessment in **Table 17**.*

The following text is derived from Table 16 in the AEP BDAR, with BAM serious and irreversible impact (SAII) provisions in italics, AEP comment in regular text, and my referenced responses to the AEP BDAR comments in bold:

(a) The action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII.

The majority of native vegetation present within the Subject Site is mapped by BAM Support as important habitat for the Swift Parrot. The distribution of native vegetation areas/patches is spread throughout the site. Therefore, given the proposed development footprint, it is highly unlikely that direct impacts to native vegetation / important habitat can be avoided[1]. Future development on site would need to consider the following management actions in line with SOS priorities for the Central Coast management site, when designing/locating a proposal.

- Avoid areas of high constraint vegetation, in particular good condition[2] vegetation containing winter foraging resources, and
- Apply a Vegetation Management Plan to the Subject Site as part of a DA, to maintain and enhance the 0.71ha of retained vegetation, in particular high constrain areas in moderate condition[3].

1. Direct impacts could be avoided by constructing the development in another location that is not mapped as important Swift Parrot habitat.

2. The condition classifications described in the BDAR focus almost exclusively on the understorey (i.e. slashed, grazed, undisturbed). These distinctions are largely irrelevant in the context of Swift Parrots, which forage almost exclusively in the canopy. Therefore all Swift Parrot habitat in the Subject Site should be considered to be in good condition.

3. Because Swift Parrots forage almost exclusively in the canopy, any Vegetation Management Plan will have little positive impact on the availability of Swift Parrot foraging habitat because management planning focuses on the understorey.

……

(b) The size of the local population directly and indirectly impacted by the development, clearing or biodiversity certification.

Swift Parrots form a single genetically homogenous breeding population. The current population estimate for this species is 2000 across its range, between breeding habitat in Tasmania and foraging habitat on mainland Australia. The entire population migrates from Tasmania to the mainland in winter, where it disperses widely foraging on flowering Eucalypts and psyllid lerps. The birds mostly occur within inland slopes in Box/Ironbark woodland habitats[1], however also utilize habitat on the coast, particularly as drought refuge. An estimate of local population size is not possible, as the species does not form disjunct local resident groups on the mainland, although given site fidelity to some sites, it is likely some birds return to familiar areas to forage when resources are available. Assessment of this species is based on important habitat mapping in NSW. Approx. 5.39ha of the draft Swift Parrot Important Areas is proposed to be cleared on the Subject Site. However, the protection of the Wadalba Wildlife Corridor will allow for the Subject Site to utilised by the species in the future[2]. Protection measures within the CEMP will ensure protection of the existing habitat through measures such as fencing, signage as discussed above[3].
Records of Swift Parrot habitat usage on the Central Coast is highly variable from year to year, dependent on inland conditions and flowering cycles of coastal Eucalypts. Swift Parrots were observed around one kilometer east of the Subject Site in May 2019. Approximately 43 sightings have been recorded in the vicinity of the Subject Site, with records occurring between and inclusive of 1996 and 2019. Interrogation of Birdlife Australia *Birdata Atlas* Records suggests there has been two large events recorded near the subject site. There were records near Wyongah Progress Hall with counts of 100 to 200 individual birds in June of 2002 and subsequently there were 4 individual birds recorded there in July of 2004. The second site is Tuggerawong Public School where counts of 30 to 200 individual birds were recorded in August 2004. These birds were recorded feeding in Forest Red Gums (dominant), Swamp Mahogany and Woollybutts (pers comms Alan Morris). Subsequently, one (1) Swift Parrot was recorded at this site in May 2019[4].

1. Swift parrots do not primarily occur on the inland slopes. Analysis of records over the past decade suggests most birds occur within 50 km of the coast.

2. Protection of the Wadalba Wildlife Corridor will not *compensate* for the loss of 5.39 Ha of mapped important habitat.

3. The suggested protection measures will have no impact on the extent or quality of remaining foraging habitat for Swift Parrots within the Subject Site.

4. There are numerous local records of Swift Parrots foraging in spotted gum that are not mentioned here (see Figure 1).

……

(c) The extent to which the impact exceeds any threshold for the potential entity that is specified in the Guidance to assist a decision-maker to determine a serious and irreversible impact.

According to the Threatened Biodiversity Data Collection, the threshold for this species is – Mapped Important Areas[1]. No measure is applied as to what level of impact on these areas constitutes a threshold exceedance. It is envisaged that an SAII can be avoided if via a detailed habitat assessment and the principals of avoid and minimise are applied to a development as detailed in Provision (a) of this table, these being:
- Retain high constraint native vegetation within the Subject Site via the implementation of the VMP[2];
- Locate development envelope to avoid areas of high constraint vegetation[3]; and
- Apply a Vegetation Management Plan (VMP) to the Subject Site as part of a DA, to maintain and enhance the condition of retained vegetation / Swift Parrot habitat[4].

1. If the threshold is mapped habitat, this suggests the loss of 5.9 ha of mapped habitat within the Subject Site constitutes a serious and irreversible impact.

2. As mentioned, the proposed vegetation condition classes are not relevant for Swift Parrots given their dependence on the canopy for foraging (the quality of which does not vary across the site).

3. See point 2.

4. There is no evidence to suggest that the VMP will enhance the quantity or quality of Swift Parrot foraging habitat within the Subject Site.

……

(d) the likely impact (including direct and indirect impacts) that the development, clearing or biodiversity certification will have on the habitat of the local population, including but not limited to:
(i) an estimate of the change in habitat available to the local population as a result of the proposed development (ii) the proposed loss, modification, destruction or isolation of the available habitat used by the local population, and
(iii) modification of habitat required for the maintenance of processes important to the species' life cycle (such as in the case of a plant – pollination, seed set, seed dispersal, germination), genetic diversity and long-term evolutionary development.
BioNet Atlas records or other documented, quantifiable means must be used by the assessor to estimate what percentage of the species' population and habitat is likely to be lost in the long term within the IBRA subregion due to the direct and indirect impacts of the development.

Significant areas of conserved interconnected habitat are available, in the immediate and broader surrounds of the Subject Site (within 10km), including Wadalba Wildlife Corridor, and Porters Creek and Tacoma Wetlands[1]. No observations of Swift Parrot were made during Songmeter[2] and diurnal surveys[3]. No BioNet Atlas records are present on the Subject Site[4]. Swift Parrot records in the area are concentrated in urban environments on the shores of Tuggerah Lakes[5] within Forest Red Gum and Swamp Mahogany, neither of which occur within the subject site[6]. Therefore, the Subject Site at best represents marginal foraging habitat for the Swift Parrot and is potentially only used by very few individuals sporadically and not on a recurring basis[7]. As a result, the proposal would not result in any

significant changes to available habitat if avoid and minimise measures, as discussed above[8], are applied to development on the Subject Site.

1. It is my understanding that many of the suggested areas mentioned as examples of 'conserved interconnected habitat' are not mapped as important Swift Parrot habitat.

2. This is totally expected given the song meter was deployed in December, when Swift Parrots are in Tasmania.

3. Also totally expected given a) bird census in December and opportunistic surveys in October, November, December and January are outside of the winter period (i.e. Swift Parrots will be in Tasmania) and b) presumably the spotted gums were not in blossom at the time any of the surveys were conducted (and therefore did not represent *functional* Swift Parrot foraging habitat at the time of the surveys).

4. This is likely because nobody other than AEP has ever looked for Swift Parrots in the Subject Site.

5. This bias is because these are the locations observers live and / or look for Swift Parrots. They do not look on private properties such as the Subject Site.

6. Spotted gum is just as important a foraging species for Swift Parrot as swamp mahogany and forest red gum are (Figure 1).

7. There is insufficient evidence available to support this supposition.

8. See response 3 to BAM provision *a* above.

(ii) As discussed above in (i), the subject site represents marginal foraging habitat for the Swift Parrot[1], high usage of preferred sites nearby[2], and large areas of conserved habitat in the broader locality. The proposed development will clear approximately 5.39ha of *draft Mapped Important Areas* and retain 0.71ha. The retained vegetation in the north-west as part of the Wadalba Wildlife Corridor will provide future foraging for the Swift Parrot through a VMP, enhancing the area's capability to support Swift Parrot in the future[3]. Therefore, the proposed future development of the site is not likely to result in a significant loss, modification or isolation of available habitat[4].

1. Given the number of musk and rainbow lorikeets I observed feeding in the Subject Site during the site visit, I do not consider the foraging habitat to be 'marginal' for Swift Parrots.

2. Usage of other sites nearby is *relatively* high simply because that is where previous observer effort has been focussed. Given the mobility of Swift Parrots and the high usage of nearby sites, it is reasonable to assume Swift Parrots could also forage within the Subject Site when present in the area.

3. Clearing 5.39 Ha of mapped habitat and implementing a VMP that focuses largely on the understorey cannot be considered as a way to enhance the capability of the site to support Swift Parrots in the future. Quite the opposite in fact.

4. If the vegetation within the Subject Site is mapped as important Swift Parrot habitat, and the proposal is to clear 5.30 Ha of this mapped habitat, I fail to see how the development will *not* 'result in significant loss, modification or isolation of available habitat.'

(iii) The Subject Site represents marginal foraging habitat for the Swift Parrot, and given breeding does not occur in NSW, any modification of habitat within the Subject Site would not impact processes important to the species life cycle[1].

1. Breeding is not the only important process in a species' life cycle.

……

(e) The likely impact on the ecology of the local population. At a minimum, address the following:
(i) For fauna:
– breeding
– foraging
– roosting, and
– dispersal or movement pathways

As discussed above in (i), Swift Parrot sightings in the area show a strong trend in the species preferring urban trees on the shore of Tuggerah Lakes including Forest Red Gum and Swamp Mahogany, as opposed to vegetation further inland[1]. Neither of the preferred food tree species were recorded within the subject site[2]. The impact of the proposal is therefore very limited[3]. Additionally, the retained lands which is proposed to be managed under a VMP will provide for future foraging through maintenance of the Wadalba Wildlife Corridor. The proposed VMP will provide future potential foraging habitat for the species[4].

1. Again, very likely explained by observer bias.

2. Spotted gum is just as important a food tree species for Swift Parrot as forest red gum and swamp mahogany (Figure 1).

3. This conclusion cannot be drawn based on the available evidence.

4. The Wadalba Wildlife Corridor and the VMP will not provide 'future potential foraging' because the corridor is already present, and the VMP focuses primarily on the understorey and is largely irrelevant for Swift Parrots.

……

(f) A description of the extent to which the local population will become fragmented or isolated as a result of the proposed development.

Due to the mobile nature of this species, and the presence of large areas of interconnecting habitat available directly adjacent to the Subject Site and surrounds, it is highly unlikely important habitat areas will become fragmented or isolated as a result of development.

I agree that although the development will reduce the amount of foraging habitat available to the local Swift Parrot population, it will not fragment or isolate the local population. Given the highly mobile nature of Swift Parrots, risk of population or fragmentation is much less than it would be for many other threatened species.

……

(g) The relationship of the local population to other population/populations of the species. This must include consideration of the interaction and importance of the local population to other population/populations for factors such as breeding, dispersal and genetic viability/diversity, and whether the local population is at the limit of the species' range.

As discussed above, Swift Parrot occur as a single population migrating between Tasmania and mainland Australia. Breeding occurs in Tasmania and their occurrence and interaction with one another on the mainland is highly variable and determined by environmental conditions suitable for foraging. They do not occur as disjunct local populations in NSW, therefore relationships within the overall population is difficult to assess. On a landscape scale, Swift Parrot preferentially utilise the Central Coast region when inland habitats are subjected to drought, and return to foraging sites on a

cyclic basis. The impact of the proposed development is likely to be limited given the large range they occupy on the mainland[1].

1. This conclusion does not acknowledge that whilst Swift Parrots do indeed have a large winter range, the central coast is used in most years by Swift Parrots, and is therefore an important area within the species winter range. The conclusion also doesn't account for cumulative loss (Reside et al. 2019) or the fact that the reason why the Swift Parrot has such a large winter range is because only a small proportion of the habitat within their range will represent viable foraging habitat at any one time (Runge et al. 2014).

……

(h) The extent to which the proposed development will lead to an increase in threats and indirect impacts, including impacts from invasive flora and fauna, that may in turn lead to a decrease in the viability of the local population.

The proposed development would result in direct impacts on native vegetation, and potential indirect impacts from edge effects. However, the Subject Site represents marginal foraging habitat for the Swift Parrot and is potentially only used by very few individuals sporadically or not on a recurring basis[1]. Therefore, any direct or indirect impacts resulting from development would not lead to a decrease in viability of the population. In addition, the proposed development will limit and restrict the impact of invasive flora and fauna through the implementation of the CEMP during construction and the VMP during operation[2].

1. Current available data is insufficient to evidence this supposition.

2. Risk of Noisy Miner encroachment into the Wadalba wildlife corridor as a result of the clearing has not been acknowledged. Most of the proposed measures described in the CEMP and the VMP are not relevant in terms of benefit to Swift Parrots.

……

(i) An estimate of the area, or number of populations and size of populations that is in the reserve system in NSW, the IBRA region and the IBRA subregion.

Swift Parrot population size is approximately 2000, which is highly mobile between Tasmania and mainland Australia. 12% of the species distribution occurs on NPWS estate[1]. The population disperses between the western slopes and coastal regions, depending on availability of foraging resources. Monitoring of the site during the implementation period of the VMP meeting the guidelines will assist in establishing the population numbers within the region[2].

1. What about the proportion of sightings, rather than range?

2. I fail to see how monitoring the Subject Site will assist in establishing population numbers within the region.

……

(j) The measure/s proposed to contribute to the recovery of the species in the IBRA subregion.

- Minimise the impact of on-site infrastructure.
- Restore or supplement habitat or habitat features.
- Reduce and maintain weed densities at low levels.
- Investigate presence/susceptibility/effects of Psittacine Beak and Feather Disease.
- Assess impacts of change in habitat/resource availability.
- Improve and maintain connectivity and extent of available habitat.

- Track species abundance / condition over time.

These are the SoS management objectives for the Swift Parrot on the Central Coast. The prosed development would appear to contradict objectives 1, 2 and 6.

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The following text are conclusions derived from Table 17 in the AEP BDAR, with my responses to conclusions in bold:

BioNet searches: Potential for species to utilise Subject Site, however, no sightings recorded on site.

Agree potential for Swift Parrots to utilise the Subject Site. No sightings recorded on site is very likely due to a lack of observer effort.

Desktop review of connectivity of sighting locations to the Subject site: Given the location of the sightings mainly consists of street trees within an urban environment it is unlikely that the site plays a significant role in connective habitat for these specific locations.

Agree that connectivity less of an issue for Swift Parrots than for many other threatened species.

Review of Foraging Species in the Region: These species are known to occur within the region. *Corymbia maculata* is a dominant canopy species on the Subject Site.

Agree.

Assessment of vegetation on site for foraging habitat: The Subject Site contains known foraging trees *C. maculata*. However, Swift Parrot shows preference for urban trees around the shore of Tuggerah Lakes including Forest Red Gum and Swamp Mahogany.

Agree the Subject Site contains known Swift Parrot foraging trees. Disagree that Swift Parrots show a preference for urban trees around Tuggerah Lakes. This apparent preference is very likely due to observer bias (i.e people are more likely to look for Swift Parrots around Tuggerah Lakes than they are within the Subject Site).

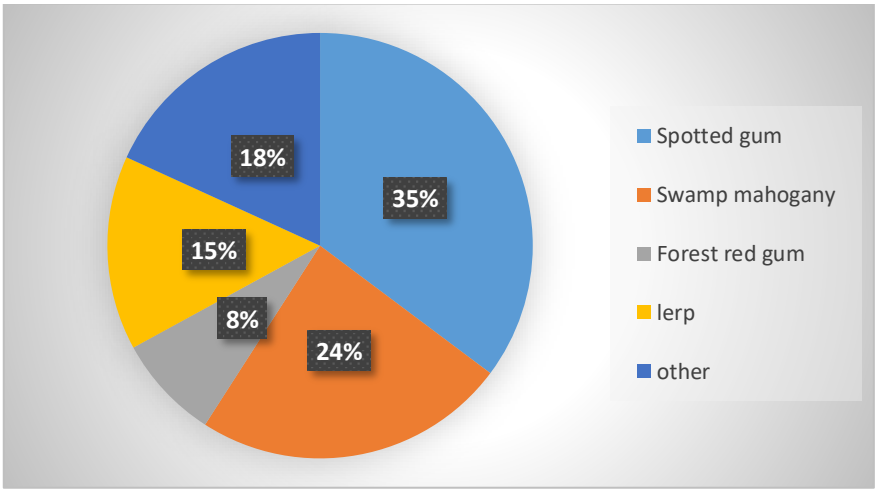

Figure 1: Proportion of Swift Parrot records within 50 km of the Subject Site broken down by food tree species / type, where such information is provided. Source: BirdLife Australia Swift Parrot sightings database.

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Section 5: Serious and irreversible impact assessment for the Swift Parrot.

Under guidelines issued by NSW DPIE, determining whether a development is likely to have a serious and irreversible impact is a 4- step process:

Step 1: Identify relevant entities at risk of a SAII.

- **Swift Parrot identified as an entity at risk of a SAII**

Step 2: Evaluate the extinction risk of the entity to be impacted

- Rapid decline (Principle 1) – population models suggest the population is in rapid decline (Heinsohn *et al.* 2015). – **Criteria met.**
- Small population size (Principle 2). Population estimated to consists of c2000 individuals. Population listed as critically endangered. – **Criteria met.**
- Limited geographic distribution (Principle 3). Swift Parrots have a broad geographic distribution but the proportion of habitat within this distribution that represents realised habitat at a given time is limited (Webb *et al.* 2017) – **Criteria met.**
- The species being unlikely to respond to management (Principle 4). Response to replacement or offsetting of lost habitat will take decades, a timescale which is not suitable for Swift Parrots given the species rapid decline – **Criteria met.**
- Swift Parrot is listed federally as critically endangered (EPBC act).

Step 3: Detail measures taken to avoid, minimise and mitigate impacts on the entity.

- Has the proponent of the proposal taken measures to avoid, minimise and mitigate impacts on the entity? – **The proponent has suggested some measures to minimise and mitigate impacts on the entity, which are described in the BDAR. However, the proponent has not considered measures to avoid the impact by constructing the development in alternative sites that are not mapped as important swift parrot habitat.**

Step 4: Evaluate a serious and irreversible impact

Species or ecological community that cannot be offset because the entity is unlikely to respond to management

1. Life history traits and/or ecology which is known, but the ability to control key threats at the site scale is negligible. **Ability to control key threats on the Subject Site (i.e. habitat loss) is negligible.**

2. Known reproductive characteristics that severely limit their ability to increase the existing population on, or occupy new habitat at, a stewardship site.

Irreplaceable:

For potential species that are identified in criteria 1 and 2 above, the likelihood of achieving an offset gain is extremely low or highly uncertain. **Ability of achieve an offset gain will take decades to achieve, which is a timescale that is not relevant to Swift Parrots given the rapid rate of their population decline (Heinsohn *et al.* 2015).**

The second factor takes into account consideration of impacts on habitat components that cannot readily be re-created.

Additional impact assessment provisions provided in the Guide comprise section 4 of this document (see above). **In my opinion, the comments made by AEP with respect to each point in Appendix B are currently insufficient to demonstrate the development with not have a serious and irreversible impact on the Swift Parrot.**

In conclusion, because:

- **The habitat within the Subject Site is mapped as important Swift Parrot habitat.**
- **The planning process has failed (in my opinion) to satisfactorily avoid potential impacts on Swift Parrots by locating the development elsewhere.**

The proposed development represents a serious and irreversible impact on Swift Parrots.

In addition, further consultation with botanical experts to determine if the vegetation community within the Subject Site is an Endangered Ecological Community should be considered.

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Section 6: Importance of the site for, and potential serious and irreversible impact on the Regent Honeyeater.

Under guidelines issued by NSW DPIE, determining whether a development is likely to have a serious and irreversible impact is a 4- step process:

Step 1: Identify relevant entities at risk of a SAII.

- **Regent Honeyeater is not currently identified as an entity at risk of a SAII in the BDAR.**

Step 2: Evaluate the extinction risk of the entity to be impacted

- Rapid decline (Principle 1) – Long term data suggest the population is in rapid decline (Commonwealth of Australia 2016). – **Criteria met.**
- Small population size (Principle 2). Population estimated to consists of c200-400 individuals. Population listed as critically endangered. – **Criteria met.**
- Limited geographic distribution (Principle 3). Regent Honeyeaters have a broad geographic distribution but the proportion of habitat within this distribution that represents realised habitat at a given time is very limited (Crates *et al.* 2019) – **Criteria met.**
- The species being unlikely to respond to management (Principle 4). Response to replacement or offsetting of lost habitat will take decades, a timescale which is not suitable for Regent Honeyeaters given the species' rapid decline – **Criteria met.**
- Regent Honeyeater is listed federally as critically endangered (EPBC act).

Step 3: Detail measures taken to avoid, minimise and mitigate impacts on the entity.

- Has the proponent of the proposal taken measures to avoid, minimise and mitigate impacts on the entity? – **The proponent has suggested some measures to minimise and mitigate impacts on the entity, which are described in the BDAR. However, the proponent has not considered measures to avoid the impact by constructing the development in alternative sites that do not contain key Regent Honeyeater key feed trees.**

Step 4: Evaluate a serious and irreversible impact

Species or ecological community that cannot be offset because the entity is unlikely to respond to management

1. Life history traits and/or ecology which is known, but the ability to control key threats at the site scale is negligible. **Ability to control key threats on the Subject Site (i.e. habitat loss) is negligible.**

2. Known reproductive characteristics that severely limit their ability to increase the existing population on, or occupy new habitat at, a stewardship site.

Irreplaceable:

For potential species that are identified in criteria 1 and 2 above, the likelihood of achieving an offset gain is extremely low or highly uncertain. **Ability of achieve an offset gain will take decades to achieve, which is a timescale that is not relevant to Regent Honeyeaters given the rapid rate of the species' population decline (Commonwealth of Australia 2016).**

The second factor takes into account consideration of impacts on habitat components that cannot readily be re-created.

Additional impact assessment provisions provided in the Guide comprise section 4 of this document (see above). **In my opinion, the comments made by AEP with respect to each point in Appendix B are currently insufficient to demonstrate the development with not have a serious and irreversible impact on the Regent Honeyeater.**

In conclusion:

- **The Subject Site does not fall within a mapped important area for Regent Honeyeaters because the Regent Honeyeater BAM mapping only considers breeding habitat.**
- **The Subject Site does however contain spotted gum, which is described as a 'key tree species for the Regent Honeyeater' in the Regent Honeyeater national recovery plan (Commonwealth of Australia 2016).**
- **Regent honeyeaters are recorded irregularly in the Central Coast LGA (Figure 4).**
- **The vegetation community within the Subject Site is very similar to Lower Hunter spotted-gum ironbark, which is a known Regent Honeyeater breeding habitat as acknowledged in Table 7 of the BDAR.**
- **Table 7 of the BDAR, which identifies species credit species, concludes Regent Honeyeater is not present on site. Given the species' rarity, nomadic nature and the degree of survey effort described in the BDAR, there is insufficient evidence to conclude that the species '*does not*' occur on the Subject Site.**
- **The planning process has failed (in my opinion) to satisfactorily avoid potential impacts on Regent Honeyeaters by locating the development elsewhere in habitats that represent less important Regent Honeyeater foraging habitat than spotted gum-ironbark forest (Commonwealth of Australia 2016).**
- **Loss of habitat within the Subject Site will reduce the availability of local resources to the Regent Honeyeater. The potential for the Subject Site to require species credits for the Regent Honeyeater should be considered.**

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7. Appendix:

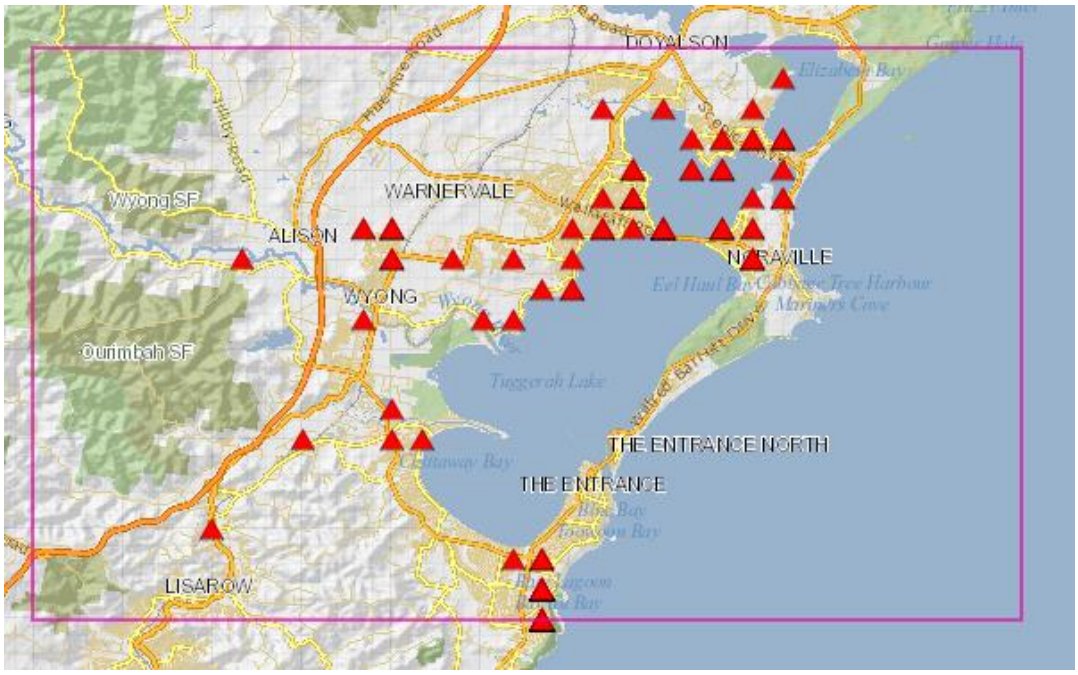

Figure 2: BioNet records of Swift Parrot within the vicinity of Wadalba.

BSM-886 swift parrot mapping

Denise Wallace <Denise.Wallace@environment.nsw.gov.au>
on behalf of
OEH ROD BAM Support Mailbox <bam.support@environment.nsw.gov.au>
Sun 24/05/2020 2:33 PM
To: Ross Crates

Hi Ross

The lots contain draft swift parrot important areas. The mapping will be finalised over the coming months, assessors are instructed to use the draft mapping for planning and check with us again before finalising the BAR.

Whilst the lots are not within regent honeyeater important areas, suitable habitat outside of important areas may generate ecosystem credits.

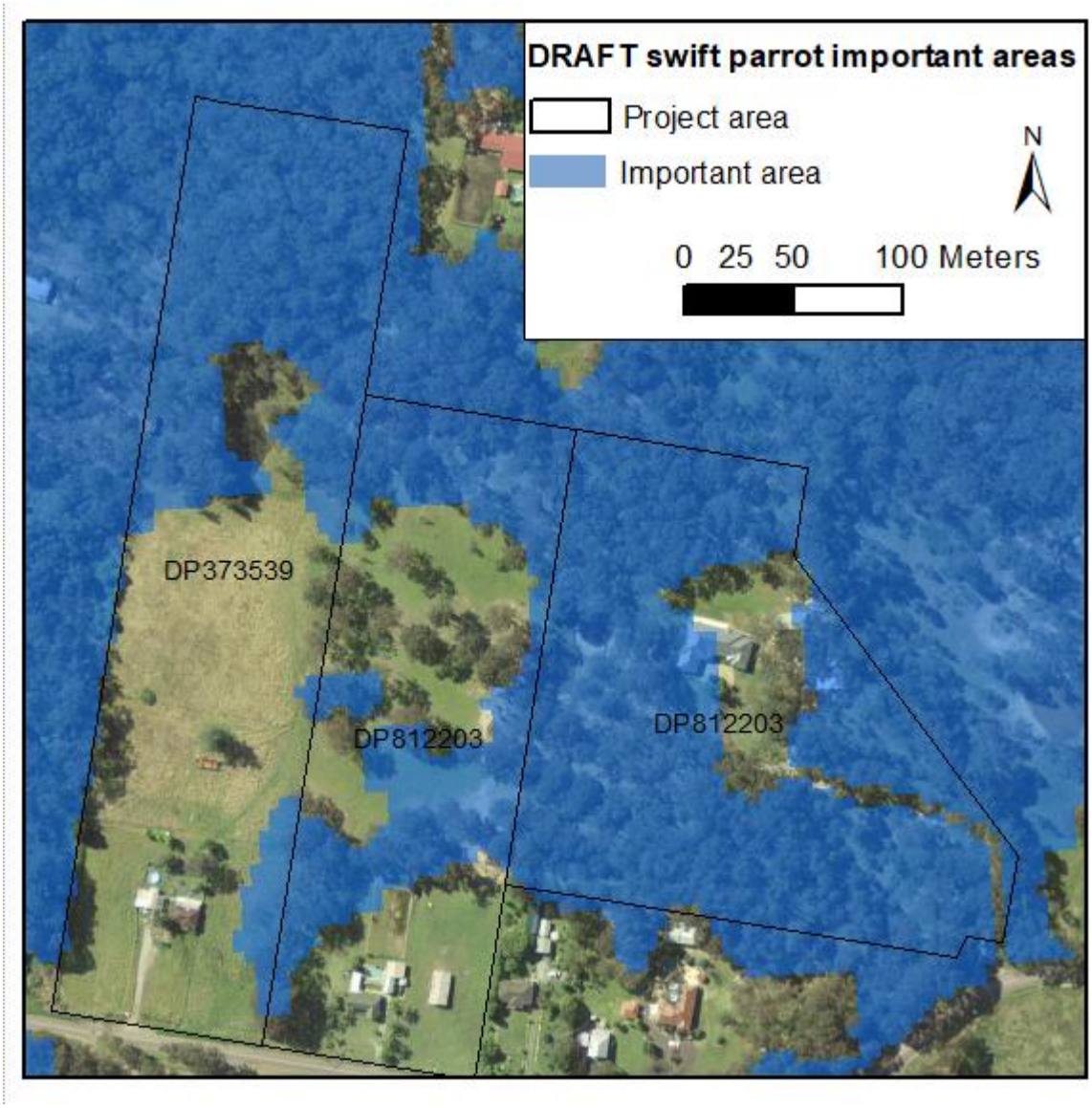

Figure 3: Correspondence with DPIE BAM support regarding Swift Parrot habitat mapping within the Subject Site.

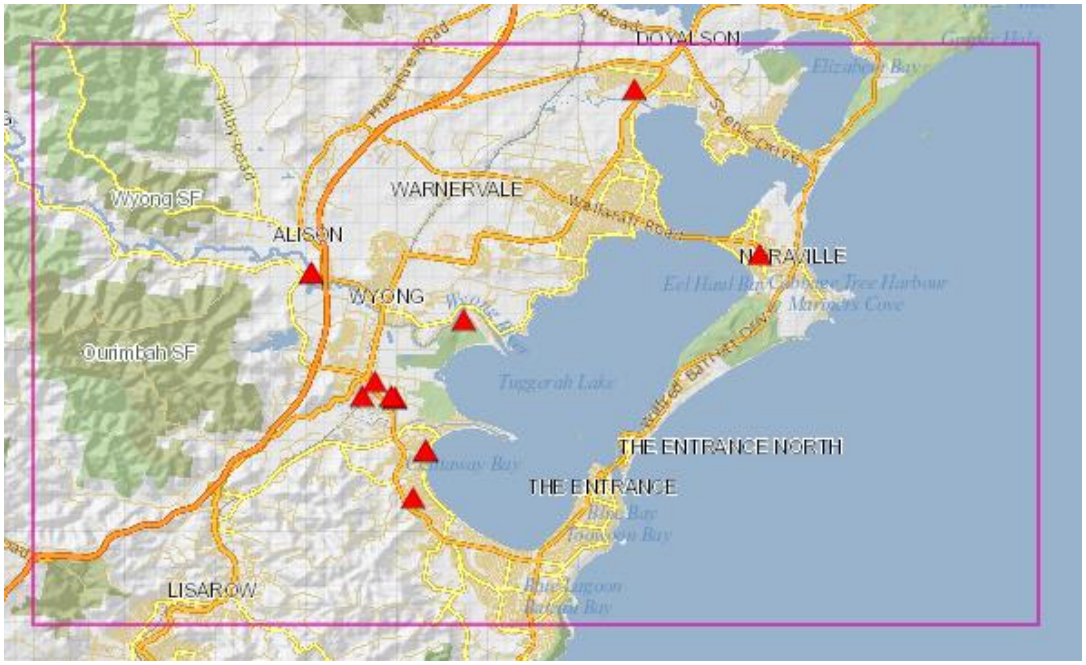

Figure 4: BioNet records of Regent Honeyeater within the vicinity of Wadalba.

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Ross Crates Curriculum Vitae

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Academic history:

- 2015 - 2018: Australian National University, Australia. PhD, regent honeyeater ecology and conservation.
- 2006-2010: University of East Anglia. BSc (1st class Hons) Ecology with a year in Australasia.
- Australian National University, Australian Postgraduate Award Research Scholarship. (2015-2018).
- Michael Graham prizes for best performance in ecology and best conservation project in the schools of Biological and Environmental Sciences, University of East Anglia (2010).

Selected employment history:

- September 2018 - Present: Australian National University- postdoctoral research fellow. Implementation of a rage-wide monitoring program for regent honeyeater conservation and development of a winter mainland monitoring program for swift parrot conservation.
- September '10 – November '13: Department of Zoology, University of Oxford- research assistant.

Selected publication history:

- **Crates, R.** et al. (in revision). Genomic impact of severe population decline in a nomadic songbird.
- Webb, M. *et al.* (2019) All the eggs in one basked? Are island refuges securing the future of an endangered endemic songbird? *Austral Ecology*. doi:/10.1111/aec.12693.
- **Crates, R.** *et al.* (2018) Spatially and temporally targeted suppression of despotic noisy miners has conservation benefits for highly mobile and threatened woodland birds. *Biological Conservation.* **227**, 343-351.
- **Crates, R.** *et al.* (2018) Contemporary breeding biology of critically endangered regent honeyeaters: implications for conservation. IBIS doi: 10.1111/ibi.12659.
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- **Crates, R.** *et al.* (2017) An occupancy approach to monitoring regent honeyeaters. *Journal of Wildlife Management* **81**, 669-677.
- **Crates, R.** *et al.* (2016) Individual variation in winter supplementary food consumption and its consequences for survival and reproduction in wild birds. *Journal of Avian Biology.* doi: 10.1111/jav.00936
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- Farine, D.R., Firth, J.A. et al. (2015) The role of social and ecological processes in structuring animal populations: a case study from automated tracking of wild birds. *Royal Society Open Science* ***2***, 150057.

Funding:

- Sapphire wind farm (2018) Swift parrot and regent honeyeater research programme. $250,000
- BirdLife Australia (2018) Twitchathon conservation fund research award. $20,000
- Cumnock Pty, RioTinto, and Mach Energy environmental research offsets (2017-2018) $250,000
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- Mohamed bin Zayed species conservation fund (2015) $19,000
- Holsworth research endowment (2015 & 2017) $12,000