



Sapphire Wind Farm

Addendum to Bird and Bat Adaptive Management Plan

Prepared for CWP Renewables

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**Nature
Advisory**

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1. Introduction

The implementation of the Bird and Bat Adaptive Management Plan (BBAMP) at Sapphire Wind Farm (SWF) began in July 2018 as a preoperational monitoring regime which largely followed the program methods outlined in the BBAMP. Full operation or operational stage surveys began in January 2019.

After 24 months of operational monitoring a Second Annual Report on the implementation of the BBAMP was produced and submitted to Biodiversity Conservation Division (BCD) on the 11th June 2021 for review. Its findings were that;

“No threatened or non-threatened management triggers occurred as a result of the monitoring program. It is unlikely that the results from the monitoring program or the mortality estimates suggest a significant impact on any of the species identified as mortalities. Each is a relatively common and widespread species to farmland landscapes in NSW and other parts of Australia, and each is considered secure and not in decline. It is unlikely that BWF would have a significant impact on any populations regionally, on a state level or overall.”

The report acknowledged that Wedge-tailed Eagle (*Aquila audax*) (WTE), nominated as an ‘at risk species’ in the BBAMP initially, was relatively more highly impacted than other bird species. As such, the report detailed a number of recommendations, based on the findings of the BBAMP 31 months implementation, for the continued implementation of the BBAMP, which are summarised below:

- The cessation of the carcass search program,
- Incidental monitoring of carcasses and feather spots continue to be reported,
- Inclusion of any incidental finds in annual reporting for the first five years of operation,
- Continuation of carrion removal, limiting lambing and stock feeding close to turbines.

CWP Renewables received a response to the Second Annual Report from BCD on the 20th July 2021 putting forward a number of additional mitigation measures and monitoring suggestions. A subsequent meeting was held between BCD, CWP Renewables and Nature Advisory to discuss these further.

The result of the discussion was that additional mitigation measures to further reduce ongoing risk to bird and bat species, specifically the WTE, at SWF be considered and revised methods for the ongoing BBAMP implementation be proposed.

As such, this document is considered as an addendum to the existing approved BBAMP and presents revised methods and mitigation measures for on-going monitoring, in conjunction with the existing BBAMP, to accommodate the above. The intention of the revised program is to focus on WTE risk mitigation and monitoring of its efficacy. This will be reviewed in annual reporting, as per Section 4.7 of the BBAMP.

The following sections outline the revised monitoring program designed to specifically target impacts to WTE, assess the effectiveness of mitigation measures and will be implemented from the date of approval of this addendum. These sections will supersede the corresponding sections in the BBAMP, in particular; Section 4: Operational phase surveys and Section 5: Mitigation measures to reduce risk of the BBAMP.

2. Ongoing operational phase surveys

Monthly carcass searches as described in Section 4.4 of the BBAMP were carried out at SWF between July 2018 and January 2021 following commencement of the operational phase of the SWF. Following the initial two years of operational monitoring and annual reporting, a refined monitoring program has been designed in consultation with BCD to target at risk species at SWF, specifically WTEs. Monitoring will continue in this manner with a review of monitoring data completed in annual report to determine if a reduced or amended monitoring effort is justified.

The revised monitoring program will commence from the date of approval of this addendum.

2.1. Carcass search regime

Data collected by Nature Advisory during scavenger trials across many wind farms in New South Wales (NSW) and Victoria, in addition to targeted WTE scavenging trials at a wind farm in NSW, show that WTE are not typically scavenged, with the vast majority of WTE carcasses remaining in situ until they completely dispose (Nature Advisory unpub. data).

Carcass monitoring will be completed at all SWF turbines every six months (or twice a year) by a person suitably experienced in the identification of birds and bats and in accordance with the search protocol outlined in Section 4.4.2 of the BBAMP. During the initial post-construction carcass monitoring program, carcass searches were conducted at 18 turbines. The revised carcass search program will see the inner and outer zone of all 75 turbines at SWF searched with no follow up pulse searches completed.

One search will aim to take place in the months following the breeding period (generally Oct-Dec) after the young have fledged. Juveniles tend to disperse during this time and may be at higher risk of collision than adults. The second search will take place six months after the first.

During the period between the formal carcass searches, incidental carcass monitoring will continue to take place by wind farm personnel with any bird or bat carcasses identified reported and recorded in accordance with Section 4.4.5 of the BBAMP.

2.2. WTE incidental monitoring and nest monitoring

In addition to the revised carcass search regime, at the commencement of the revised operational monitoring program, a nest search will be completed at SWF to identify any potential WTE nests inside the project area. The nests identified during this search will be recorded and monitored on an annual basis during October to December to record breeding activity and utilisation. The intention of this monitoring is to monitor utilisation for breeding purposes and utilisation in general.

Incidental monitoring of WTE flight paths will be undertaken during any site visit by ecologists. Observations will contribute to monitoring site usage and WTE numbers.

Increased or decreased breeding activity or site utilisation may provide additional insight into the impacts on WTE and effectiveness of mitigation measures. These findings will be included in reporting.

2.3. Reporting

Refinements to the monitoring program were made in this addendum after two years of operational monitoring in accordance with the BBAMP and in consultation with the DPIE/BCD. These monitoring program refinements and outcomes of the implementation and effectiveness of mitigation measures will be documented and periodically reported in accordance with the reporting requirements outlined in the BBAMP (Section 4.7).

In addition, monitoring of emerging technologies to minimise bird and bat strike will be ongoing with emerging technologies and opportunities for their use assessed at the Sapphire Wind Farm. This will be reviewed at each reporting period and Table 1 review of proposed mitigation measures will be updated as required.

3. Review of proposed mitigation measures

The table below considers a number of mitigation measures discussed with BCD or investigated independently . Discusses the appropriateness of each in relation to SWF's impacts on WTE and its inclusion in any further impact monitoring and mitigation program moving forward.

Mitigation measure considerations	Pros	Cons	Recommendation
Painting one turbine blade black.	An international study ¹ has shown that painting one blade black reduces impacts on Eagles by increasing visibility of blade movement.	The experiment was done on a different species to WTE and in a different environment, therefore the efficacy of applying this at any wind farm in Australia, and SWF for WTE is unknown. In addition, the technical aspects of painting a blade black poses a number of issues for SWF such as visual amenity impacts on local landholders, impact to contracted blade specifications, potential aviation requirements, approval restrictions, thermodynamic issues, contractual restrictions and a high cost of retrofitting existing wind turbines.	As monthly monitoring detected zero WTE mortalities in the first year and five in the second, it would be difficult to statistically determine whether the application of the mitigation measure is significantly reducing impacts. This mitigation measure is not currently recommended nor considered reasonable given the uncertainty of effectiveness, high cost of installation and assessed impact.
Noise to discourage WTE approaching turbines.	Known to work to reduce utilisation of spaces by birds at places such as airports.	Measure would create high levels of disturbance to local landholders and have unknown side effects to WTE and other species using the site including stock.	Not recommended due to potential impact and opposition by landholders due to noise disturbance.
Radar systems to detect WTE and initiate turbine	A study ² for Cattle Hill WF in Tasmania identified 'IdentiFlight' as system designed to identify	A report of the efficacy of 'IdentiFlight' at Cattle Hill does not appear to be available as yet. There is also a high cost of installation	Given the high cost of installation and potential impacts the WF financial viability commensurate to the likely 'low' impact on WTE populations

¹ May R, Nygård T, Falkdalen U, Åström J, O Hamre, Stokke BG, 2020. Paint it black: Efficacy of increased wind-turbine rotor blade visibility to reduce avian fatalities. *Ecol Evol.* 202; 10:8927-8935. <https://doi.org/10.1002/ece3.6592>

² Joule Logic 2018. Cattle Hill Wind Farm Collision Avoidance and Detection Plan (CADP). Developed for Cattle Hill Wind Farm. <https://cattlehillwindfarm.com/>

Mitigation measure considerations	Pros	Cons	Recommendation
shut down procedures at specific turbines	eagles approaching turbines and shutdown that turbine until the risk of collision has reduced and has been trialled at the site since 2018.	and potentially significant impacts on SWF financial viability and electricity generation capacity.	assessed to date, and unavailable data on efficacy of the measure, this approach is not recommended at SWF.
Formalised program of reducing prey and scavenging opportunity near turbines.	Reduction of scavenging and foraging opportunities near turbines should reduce foraging behaviour in the vicinity, thereby lowering risk to WTE from collision.	The BBAMP (Section 5) detailed a program of carcass removal etc. to be implemented throughout the initial 31-month monitoring program. Despite this WTE mortality occurred and the program's continuation as is may not further reduce risk to WTE.	A formalised monitoring and pest removal program for rabbits, particularly in events where burrows have formed within 200m of turbines. Lambing monitoring program to be established including landholder liaison, monitoring and recording. This improved program can be monitored and assessed for efficacy and compared with previous monitoring.

4. Mitigation measures to reduce risk

Mitigation measures have been revised following the findings of the first two years of operational monitoring to target risks to WTE and consultation with the BCD. As a component of this revision, an assessment of alternative mitigation options has been completed to identify any other mitigation options (Section 3 above) which may be reasonable and feasible when compared with the monitored impact on the 'at risk' species, WTE thus far.

The following provides amendments and improvements to Section 5 of the BBAMP mitigation measures to improve the implementation of measures and enable assessment and review in annual reporting. The aim of the revised program is to track implementation of mitigation measures at SWF and their outcomes and then assess this against the findings of the revised monitoring program and potential impacts on WTE throughout the operation of SWF.

Land-use and stock management below and around turbines can influence the presence and behaviour of native birds on site. Examples include:

- Grain feeding can be an “attractant” for parrots; and
- Carrion and rabbits can be an “attractant” to raptors in the area.

Thus, this section proposes possible mitigation measures to address these matters.

A moderate risk to WTE has been identified for SWF. The WTE and other raptors forage for carrion (dead and decaying flesh of an animal) and also on small mammals, rabbits etc. In order to reduce the risk of raptors colliding with turbines, a formalised carrion monitoring and removal program will be implemented during operations, to reduce the attractiveness of the site to raptors (specifically WTE) and therefore reduce the potential for fatal collisions by this group of birds. This program will focus on an area of a minimum of 200 metres around turbines, where safe, feasible and practical. The procedures below will be adopted:

- The SWF Site Manager has been appointed to perform the function of Carrion Removal Coordinator who will undertake the activities described below. In the event the SWF Site Manager is not available, an alternative suitable person will be appointed to undertake this function.
 - Monthly inspections of the wind farm site to search for any stock, introduced or native mammal and bird carcasses (to be recorded as incidental finds) that may attract raptors (e.g., kangaroo, pigs, goats, foxes, rabbits, dead stock). This search will be undertaken via vehicle and visual checks in addition to using binoculars to look for large carcasses within 200 metres of each turbine. Results from inspections will be documented and the following information collected each month:
 - Date of inspection,
 - Person undertaking the inspection,
 - Any carrion identified and location (e.g., Turbine ID),
 - Any carrion still present from previous inspection,
 - Action taken (e.g., consultation with landholders or removal of carrion)
 - Pest animal activity or presence,
 - Lambing activity (when applicable),
 - Any incidental observations by landowners or SWF staff.

- Additional, opportunistic observations by operators during normal inspections and work routines and by landowners as they travel around their properties provides further opportunity to identify and report carcasses of stock or feral animals so that timely collection can be undertaken to remove them. This can be address by operator and landowner protocols and information included in monthly inspection data
 - Carcasses observed on the wind farm site should be collected and disposed appropriately. Any carcasses and/or remains found that are within 200 metres of turbines, will be collected and removed within two weeks or as soon as possible, in a manner that will avoid attracting raptors close to turbines.
 - Consult with landowner or wind farm staff in relation to the appropriate disposal of collected carrion, to be located at least 200 metres away from the closest turbine. Results of consultations will be logged and the locations of any carrion dumps active or planned noted. This can be assessed against any potential WTE mortality locations.
 - Carcass occurrence and removal will be recorded in monthly inspection records maintained by SWF Project Manager.
- During lambing season (usually late autumn/winder) young lambs are susceptible to death. Therefore, if possible and subject to agreement of landowners, lambing will be restricted in paddocks at least 200 metres away from turbines, where practicable, to reduce the risk that raptors (WTE in particular) are attracted close to the turbines.
 - A consultation log with landholders will be maintained and used to inform ongoing success of mitigation measures. Consultation will be had with landholders requesting that they keep lambing to paddocks without access to turbines where possible. Actual locations of lambing activity will be recorded during monthly inspections to map actual land use activity during operation. This can be compared with any potential WTE mortality identified during carcass searches.
 - In order to reduce collision risks to birds, where practical and with landowner agreement, the practice of grain feeding of stock within 200 metres of turbines should be minimised as it could cause draw additional parrots and other birds to the site.
 - Any feral animal control on the wind farm site should involve the removal and appropriate disposal of resulting carcasses in a timely manner.
 - If a large active presence of rabbits is observed during monthly inspections near turbines, subject to landholder approval, an integrated rabbit control program (to reduce site attractiveness to WTE) will be completed within 200 metres of turbines. Methods to control rabbits include burrow destruction and shooting. Any rabbit control program will require cooperation and agreement from the landowner.
 - Monthly inspection data, actual land use and land holder consultations covering the information requirements above, will be reported on in accordance with the BBAMP reporting requirements and provided to BCD covering 12 months of implementation from the date of the approval of this addendum.

Using the information collected above, the efficacy of the mitigation measures implemented will be assessed. This will include assessment against; carrion occurrence rates, removal requests and actual removal undertaken and actual land use (lambing and carrion dump locations) using WTE carcass search data and site utilisation data.

The program will be reviewed in accordance with the BBAMP reporting requirements. If, for example, WTE mortality increases when compared to the initial 24-month operational monitoring period, then the need

for continuation or refinement or additional mitigation measures will be discussed, in consultation with BCD/DPIE.
