

# CATTLE HILL Wind Farm



## Annual Environmental Review 2023

Review period: 1 July 2022 to 30 June 2023

*Prepared in satisfaction of State EPN 10105/1 Condition G10*

Prepared By: Goldwind Australia



On behalf of: Wild Cattle Hill Pty Ltd



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## Definitions and Abbreviations

<b>AER</b>	Annual Environmental Review
<b>Cattle Hill Wind Farm</b>	Wind Farm comprising 48 wind turbines and up to 150 MW capacity
<b>Central Highlands Region</b>	Is that described as the area north of Bothwell, east of Bronte Park and surrounds, south of Liawenee, and west of the Great Western Tiers
<b>CHC</b>	Central Highlands Council
<b>CHWF</b>	Cattle Hill Wind Farm
<b>Commissioning (EPN)</b>	EPN 10105/1 defines commissioning as the testing of turbines and is taken to be completed when 90% of the turbines are being operated in the course of normal commercial operations.
<b>DAWE</b>	Department of Agriculture, Water, and the Environment (formerly DoEE)
<b>Director</b>	Director of the Tasmanian Environment Protection Authority, holding office under Section 18 of EMPCA and includes a person authorised in writing by the Director to exercise a power or function on the Director's behalf.
<b>DCCEEW</b>	Commonwealth Department of Climate Change, Energy Efficiency, and Water
<b>DNRE</b>	Tasmanian Department of Natural Resources and the Environment
<b>DPIPWE</b>	Tasmanian Department of Primary Industry, Parks, Water and Environment
<b>EMOP</b>	Eagle Mortality Offset Plan
<b>EMPCA</b>	Environmental Management and Pollution Control Act 1994
<b>EPA</b>	Tasmanian Environment Protection Authority
<b>EPBC</b>	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
<b>EPBC 2009/4839</b>	EPBC Approval No. 2009/4839
<b>EPN</b>	Environment Protection Notice 10105/1 (issued by Tasmanian EPA on 13 March 2019)
<b>ERP</b>	Emergency Response Plan
<b>FOMP</b>	Flora Offset Management Plan
<b>GWA</b>	Goldwind Australia Pty Ltd (ACN 140 108 390)
<b>Ha</b>	Hectare
<b>IDF</b>	IdentiFlight System
<b>kV</b>	Kilovolt
<b>MW</b>	Megawatt
<b>NVA</b>	Natural Values Atlas
<b>O&amp;M</b>	Operations and Maintenance (Phase of Development)
<b>OEMP</b>	Operations Environmental Management Plan (approved under Condition G11 of EPN 10105/1)
<b>PCA</b>	Powerchina Australia Development Pty Ltd.
<b>RMPAT</b>	Resource Management and Planning Appeal Tribunal
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>TasNetworks</b>	Own, operate and maintain the electricity transmission and distribution network in Tasmania.
<b>TFS</b>	Tasmanian Fire Services
<b>The Land</b>	Described as that situated immediately east of Lake Echo and off Bashan Rd, approximately 3km southwest of Waddamana in central Tasmania, including part or all of titles 135246/1; 29897/1; 29897/3; 29897/5; 248810/1; 135247/1; 135247/2; 29888/4; and 29897/6
<b>The Proponent</b>	Wild Cattle Hill Pty Ltd (WCHPL) ACN 610 777 369
<b>WTE</b>	Tasmanian Wedge-tailed Eagle ( <i>Aquila audax fleayi</i> )
<b>WBSE</b>	White-bellied Sea-eagle ( <i>Haliaeetus leucogaster</i> )
<b>WCHPL</b>	Wild Cattle Hill Pty Ltd (ACN 610 777 369).

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Appendix C	Hazardous Substances Inventory
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## Managing Director's Statement

*This is the Sixth Annual Environmental Review (AER) for the Cattle Hill Wind Farm, located in Tasmania's Central Highlands.*

*The AER has been prepared in accordance with the requirements of Condition G10 of Environment Protection Notice 10105/1 issued by EPA.*

*This AER will be made publicly available through publication on the Cattle Hill Wind Farm website: ([www.cattlehillwindfarm.com](http://www.cattlehillwindfarm.com)).*

*As required under Condition G10, this AER has been prepared for submission to the Director of the Environment Protection Authority within 3 months of the end of the review period (1 July 2022 – 30 June 2023).*

*I acknowledge and endorse the contents of this review.*



Jie Yao

Managing Director, PowerChina Australia, on behalf of Wild Cattle Hill Pty Ltd

27 September 2023



Ning Chen

Managing Director, Goldwind Australia, on behalf of Wild Cattle Hill Pty Ltd

27 September 2023



# 1. Introduction

## 1.1 Purpose of this document

This Annual Environmental Review (AER) 2023 has been prepared in accordance with requirements of Environment Protection Notice (EPN) No. 10105/1 Condition G10, which requires annual reporting of project performance against environmental requirements outlined in the project's regulatory approvals, and their implementation via relevant approved management plans.

The report has been prepared by Goldwind Australia (GWA) on behalf of the proponent, Wild Cattle Hill Pty Ltd (WCHPL).

This AER covers the period from 1 July 2022 to 30 June 2023 (the review period) and has been prepared in accordance with State EPN 10105/1 Condition G10 (provided in full as Appendix A).

## 1.2 Cattle Hill Wind Farm

The Cattle Hill Wind Farm (CHWF) has an installed total capacity of approximately 148.5MW and is allowed by the Grid operator to export up to 144 MW to the Grid when wind conditions allow for maximum generation.

The amount of clean energy generated by the CHWF each year is sufficient to meet the total power demand of approximately 16,765 Tasmanian households (around 7% of the houses in Tasmania)<sup>1</sup>.

The CHWF commenced operations in 2020, boosted Tasmania's renewable energy supply by 5%, and helped Tasmania achieve its goal of becoming 100% powered by renewable energy the same year. Approval of CHWF as an accredited power station in 2020 also allowed the Australian Government's Large-scale Renewable Energy Target of securing an additional 33,000-gigawatt hours of renewable energy to be surpassed.

CHWF was the first wind farm in the southern hemisphere to install the IdentiFlight eagle detection and collision avoidance system, winning the Clean Energy Council innovation award in 2021 for successfully pioneering this technology in Australia. The CHWF was also the first wind farm in Tasmania to utilize detection dogs for carcass monitoring. The project team continue to share lessons from these and other initiatives freely with other wind farm developers and regulators, in the interest of advancing best practices for protection of the environment on wind farms.

## 1.3 Proponent Details

Wild Cattle Hill Pty Ltd (WCHPL) is the proponent, and the 'Responsible Person' for the project under State EPN 10105/1. Shareholders for WCHPL are:

- Powerchina, and
- Goldwind Australia (see definitions for further details).

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<sup>1</sup> 2021 Census data recorded a total of 229,000 occupied houses in Tasmania.



## 1.4 Structure of this Report

This AER provides a review of performance against environmental obligations outlined in the project’s regulatory approvals and implementation of associated approved management plans.

Table 1.1 provides a reference to sections of this AER which address the requirements of Condition G10 of the State EPN.

*Table 1.1: AER Reporting Requirements and where they are addressed in this document.*

Condition G10 reference and Summary of Reporting Requirements		AER Section
1.1	Statement by General Manager or equivalent acknowledging contents of AER	Preface
1.2	List of complaints received from the public and description of any actions taken as a result	4.1, 4.1.1
1.3	Environment-related procedural or process changes implemented during the review period	4.4
1.4	Amounts of waste produced and treatment methods implemented during the review period	4.3.1
1.5	Non-trivial environmental incidents and/or noncompliance with permit conditions	4.2
1.6	Summary of monitoring data and record keeping required by conditions of EPN	5
1.7	Breaches of limits specified in conditions	4.5
1.8	Other issues	5.4, 7
1.9	Summary of fulfilment of environmental commitments	8
1.10	Summary of any community consultation and communication	6
1.11	Potential changes to the activity over the next 12 months	8



*Figure 1.1: Cattle Hill Wind Farm*

## 2 Project Overview

### 2.1 Project Location

CHWF is located in Tasmania’s central highlands, immediately east of Lake Echo and approximately 3km southwest of Waddamana. The site is within a sparsely populated and relatively isolated part of the Central Highlands Council municipal area, on land which ranges from 700-920 metres above sea level (Figure 2.1).

The site is approximately 35 kilometres south of the township of Miena and is bordered geographically by Lake Echo to the West, and the Ouse River valley to the east, where the former Waddamana Power Station remains as a heritage site and museum.

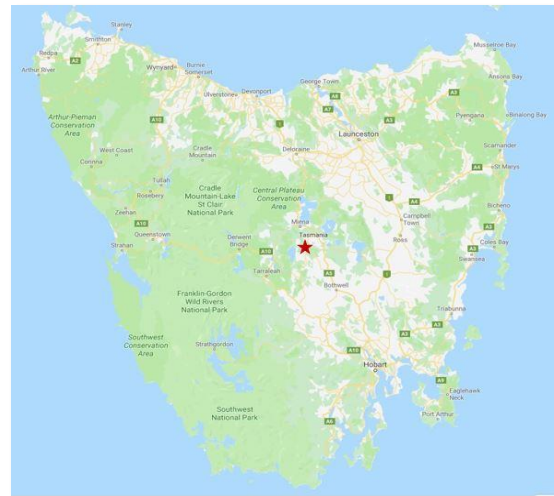


Figure 2.1: Cattle Hill Wind Farm location

The site is accessible by unsealed roads from the northeast, east and south, which after completion of construction of the CHWF in 2020, have returned to their former low traffic levels.

CHWF exports power to the Tasmanian electricity supply network via a short section (approximately 250 metres) of 220 kV overhead line which connects the wind farm substation to the TasNetworks high voltage electricity transmission network which crosses the site. Aside from this, there are no overhead lines associated with the development.

In addition to operation and maintenance of CHWF, activities undertaken on the land include farming, operation and maintenance of the TasNetworks transmission line, and scattered residential dwellings.

### 2.2 Project Background

CHWF has had a long planning history; subject to a planning application based on a Development Plan and Environmental Management Plan (DPEMP, 2010) that led to initial approval by Tasmanian State and Local Regulators on 15 December 2011 that was amended by RMPAT in April 2012 and, and an EPBC Referral (EPBC 2009/4839) to the (now) Commonwealth Department of Agriculture, Water and Environment (DAWE) and subsequent EPBC approval in December 2014.

The initial development approval was issued to NP Power Pty Ltd, then transferred to One Wind Australia Pty Ltd and followed by Tasberry Holdings Pty Ltd in 2016. WCHPL (the current proponent) acquired the project in October 2017 and redesigned aspects of it in accordance with a series of Commonwealth, State and Local development approvals (see Section 2.5).

WCHPL has substantially condensed the project footprint from its original proposal for a 100-turbine layout to a more compact 48 turbine layout, with increased tower height and higher capacity turbines, resulting in a more efficient project, with significantly reduced environmental impact.

## 2.3 Infrastructure Components

Following completion of construction of the CHWF, all temporary facilities such as batching plants and the main construction compound were removed from site. Permanent infrastructure components which will remain throughout the life span of the project are described in Table 2.1 and shown on the wind farm layout map (Figure 2.2).

Table 2.1: CHWF Infrastructure (Operations Phase)

Component	Description
Turbines and towers	The CHWF consists of 48 wind turbines with a generating capacity of 148.5 MW. The turbines utilise Goldwind Permanent Magnet Direct Drive technology, and have a tip height of 170 m above ground level, a hub height of 100 m and rotor diameter of 140 m. Near the base of each tower is an external kiosk-style 33kV transformer and two banks of cooling fans. Cooling fluid circulates between the cooling fan units and internal areas of the tower and turbine. No aviation safety lighting is required on the wind turbines. Lighting is provided at the entry to each tower. The turbines are off-white/grey with non-reflective finish.
Hardstands	Hardstands formed during construction are used for large cranes and component laydown at each turbine site and are retained and maintained to allow for maintenance activities during the operation of the wind farm.
Substation and switchyard	An on-site substation within a security fenced compound receives 33 kV cables from each of the wind farm's five collector groups, via a 33-kV switch room. Voltage is stepped up to 220kV by a bundled 33kV/220 kV transformer before connecting to the Tas Networks 220 kV OH transmission line via a switchyard, overhead gantry, and short section of overhead 220kV line and cut-in poles. Beneath the substation is an earthing grid for electrical protection.
O&M facility	The Operations and Maintenance (O&M) facility is a permanent facility which will be used for operation and maintenance functions throughout the life of the project. The facility includes offices and amenities, a carpark, storage and maintenance buildings, a workshop, laydown area, and fire safety infrastructure.
Underground cables	A network of 33kV underground cables links each of the 48 turbines to the onsite substation. Where possible, these cables were installed adjacent to access tracks to minimise disturbance.
Internal access tracks	A network of internal access tracks has been established to provide all weather access to all turbine sites and the substation and has been designed to facilitate over-dimensional deliveries.
IdentiFlight system	The CHWF includes 16 IdentiFlight (IDF) pole mounted avian protection units installed as part of an Australian first technology trial aiming to reduce collision risk for the Tasmanian Wedge-Tailed Eagle. The IDF units are connected to the wind farm's electrical and communication systems and integrated with the CHWF SCADA system, and send signals to curtail any turbine, if an eagle is at risk of entering the turbine's Rotor Swept Area (RSA) based on its speed and trajectory. A 17th IDF unit was installed during the review period to address IDF blind spots associated with the 16 units originally installed.
External road upgrades	To allow large component deliveries such as turbine blades, nacelles, tower sections and generators during construction, as well as provide safe access for maintenance of components during operations, significant upgrades to approximately 30 kilometers of external roads were undertaken. These works were completed during the previous review period, prior to the over-dimensional transport of Wind Turbine components. The upgraded roads have since been handed back to CHC for ongoing management.



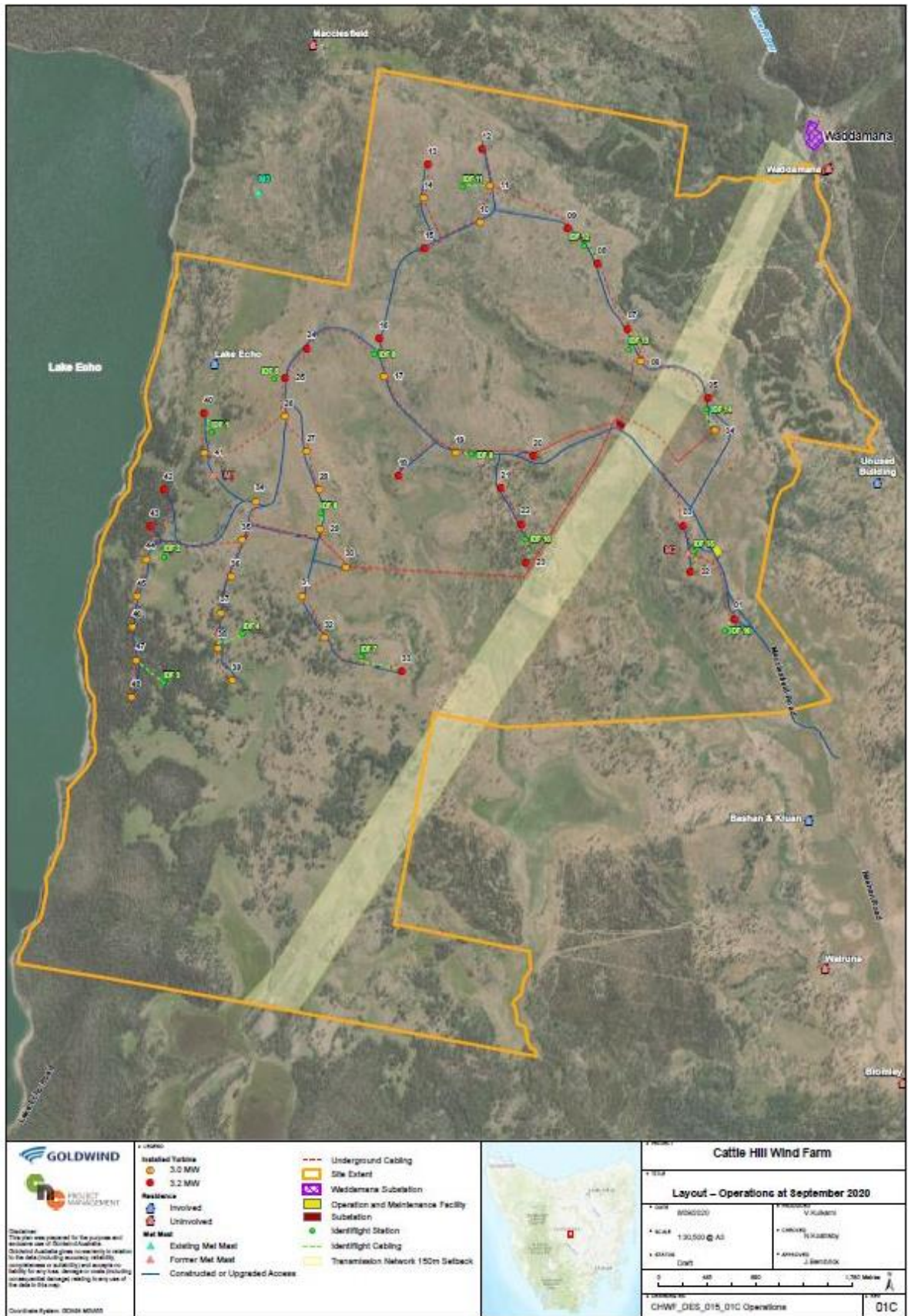


Figure 2.2: Cattle Hill Wind Farm Final (As-Built) Layout

## 2.4 Site Exclusions and Restricted Areas

The CHWF is situated in a remote part of the Central Highlands, spanning two large private landholdings which are primarily used for farming purposes (sheep and cattle). Parts of the site contain areas of cultural heritage and ecological significance, which are protected by existing and proposed covenants.

The following restrictions and requirements have been incorporated into the design of the CHWF and are to be adhered to by all persons on site, for the operational life of the facility:

- A pre-existing 'Lake Echo' conservation covenant which has limits on the placement of infrastructure. DPIPW has authorized designated activities within the covenant.
- A 1,000 m infrastructure buffer from known Wedge-tailed Eagle or White-bellied Sea Eagle nests as of December 2017, when the wind farm layout was approved by EPA).
- A 60 m buffer for eagle high risk collision zones
- An infrastructure buffer of 100 m from the high-water mark of Lake Echo
- An infrastructure buffer of 150 m from the nearest transmission line on the site (Figure 2.2)
- A 30 m buffer from known mammal dens and nests.
- A 30 m buffer around listed flora and habitat to be protected.
- Avoidance of disturbance of Highland Poa and orchid habitat within the 'Lake Echo' covenant, except as permitted by Permits to Take and/or the Covenant Authorisation
- A 50 m buffer zone around European (Huts) and Aboriginal cultural heritage sites (TASI sites)
- Animal carcasses (e.g., from shooters operating on the property to control deer on behalf of the landowner) found within 500m of turbines must be disposed of in approved carcass pits on site and covered within 24 hours, so as not to attract eagles near turbines.
- Shooters are prohibited from shooting native animals within the Lake Echo Conservation Covenant.
- Shooting is prohibited within 200 metres of turbines.
- Calving is not to be undertaken within 200m of turbines.
- Carbon Credits Forest, part of the Forests Alive project administered by the Clean Energy Regulator. Turbines 42 - 48 near Lake Echo are located within this forest. To allow for construction of these turbines, parts of this covenant had been previously removed by the landowner, however for Carbon Forest outside these areas, clearance of vegetation is prohibited.

Following detailed design of the CHWF, two additional covenant areas were identified on the site to offset impacts to Commonwealth and State listed species which could not be avoided in design:

- A conservation covenant (Bashan Ledge) for protection of EPBC listed orchid species;
- A conservation covenant for protection of State listed species *Discaria pubescens*

These proposed covenant areas have been excluded from staff or visitor access since 2020, with ecologists carrying out monitoring for the Bashan ledge offset since 2020 in accordance with the Flora Offset Management Plan, and protective fencing established in 2022.

However, at the time of writing, the process of registering both offsets as protective covenants between NRE and the landowner remains incomplete.

## 2.5 Key Project Approvals

CHWF operates in accordance with Commonwealth, State, and Local permits and approvals, and related approved management plans and processes to support effective implementation of requirements (summarized in Table 2.2).

Table 2.2: CHWF regulatory approvals and related management plans and processes

Primary approval	Related Approved Management Plans
<p><b>EPBC Approval Notice 2009/4839</b> issued by the Department of Agriculture, Water and Environment (DAWE) (now DECCW) on 15 December 2014. Amended on 22 November 2022 to change timeframe for submission of incident investigations to fifteen (15) days following notification.</p>	<ul style="list-style-type: none"> <li>• Weed Management Strategy and Plan</li> <li>• Flora Offset Strategy</li> <li>• Flora Offset Management Plan</li> <li>• Collision Avoidance and Detection Plan</li> <li>• Annual Compliance Review</li> <li>• Notifications and Reporting</li> </ul>
<p><b>State Environmental Protection Notice EPN 10105/1</b> issued by the Tasmanian EPA on 13/03/2019</p>	<ul style="list-style-type: none"> <li>• Design Report</li> <li>• Eagle Nest Productivity Monitoring Plan</li> <li>• Post Commissioning Eagle Utilisation Monitoring Plan</li> <li>• Bird and Bat Mortality Monitoring Plan</li> <li>• Eagle Mortality Offsets and Offset Plan</li> <li>• Hunting and Culling Management Plan</li> <li>• Complaints Register</li> <li>• Emergency Response Plan</li> <li>• Turbine Shutdown Management Plan</li> <li>• Operational Environmental Management Plan</li> <li>• Post Commissioning Noise Survey</li> <li>• Annual Environmental Review</li> <li>• Notifications and Reporting</li> </ul>
<p><b>Planning Permit DA 2010/19</b> to use and develop land to establish wind farm and ancillary infrastructure, issued by Central Highlands Council (CHC) on 15 December 2011, RMPAT decision April 2012 as amended on 25/10/18.</p>	<ul style="list-style-type: none"> <li>• Traffic Management Plan</li> <li>• Approval of Signage</li> <li>• Approval of colours / finishing on towers and turbines</li> <li>• Building permits (permanent buildings)</li> </ul>
<p><b>Planning Permit DA 2017/56</b> to use and develop land to install sixteen IdentiFlight stations as part of an eagle collision avoidance trial, issued by CHC on 30/01/18.  This permit was amended in March 2023 to allow for the use and development of land to establish an additional 17<sup>th</sup> IDF station in response to eagle mortalities (discussed in Sections 4 and 7 of this AER).</p>	<ul style="list-style-type: none"> <li>• Location and Design in accordance with the Permit</li> <li>• Building permits for IdentiFlight towers</li> <li>• Design report</li> <li>• Eagle Nest Productivity Monitoring Plan.</li> </ul>

## 3 CHWF Project Status

### 3.1 Design Changes during the review period

The major design change which occurred during the review period was the establishment of an additional 30m Identiflight (IDF) Station to complement the sixteen IDF stations established as part of the IDF technology trial to reduce impacts on eagles.

This additional IDF station has been sited within the forest section of the wind farm near Lake Echo, where eagle mortalities have occurred. Due to the topography of the site, and protected Carbon Forest surrounding the turbines, the IDF stations installed on 7m and 10m towers as part of the technology trial cannot see over the 30m tree canopy and do not have visibility of the lower parts of turbines in this area.

The additional IDF station is discussed further in Sections 4 and 7.

### 3.2 Activities Undertaken within Review Period

Key activities for CHWF undertaken during the review period are summarised in Table 3.1 with reference to relevant sections of this AER.

Table 3.1: Activities undertaken within Current Review Period.

Key Activities Undertaken within Current Review Period	AER Section	Date
Finalization of Decommissioning and Rehabilitation Plan for the CHWF	Section 5.2.8	July 2022
Notification of WTE mortality in accordance with Condition FF11	Section 4.2	July 2022
Notification of two WTE mortalities in accordance with Condition FF11	Section 4.2	August 2022
Round 2 of Community Fund Opens	Section 6	August 2022
Notification of WTE mortality in accordance with Condition FF11	Section 4.2	September 2022
Site Meeting with EPA and Power China to discuss additional IDF station		October 2022
Eagle nest checks required by Eagle Nest Productivity Monitoring Plan	Section 5.2.2	November 2022
Heavy metal and rodenticide testing results for WTE mortalities received	Section 7.1.1	December 2022
Emergency Services site familiarization tour	Section 6	January 2023
Completion of two years Eagle Utilization Monitoring required by EUMP	Section 5.2.3	February 2023
Planning Permit approved for additional 17 <sup>th</sup> IDF station	Section 2.5	March 2023
On-site refueling system implemented at CHWF	Section 5.4.3	March 2023
Notification of WTE mortality in accordance with Condition FF11	Section 4.2	April 2023
Vegetation clearance undertaken for new IDF tower	Section 4, 7	May 2023
Construction of additional IDF station (IDF 17-45) to mitigate eagle risk	Section 4, 7	June 2023
Ongoing carcass monitoring required by BBMMP	Section 5.2.5	Throughout review period
Ongoing implementation of OEMP	Section 5	Throughout review period
Ongoing operation and maintenance of IDF system.	Section 7, 8	Throughout review period
Ongoing community engagement activities	Section 6	Throughout review period



## 4 General Environmental Management

### 4.1 Complaints made by the Public during the Review Period

Enquiries and complaints in relation to CHWF are managed in accordance with a Complaints Management System designed to meet *AS/NZS 10002:2014 – Guidelines for Complaint Management in Organisations*, which outlines processes and associated timeframes for:

- registering all enquiries and complaints
- collecting information and responding to enquiries and complaints
- addressing and resolving complaints; and
- mediation if resolution is not reached.

The system includes a dedicated database which is used to store, track, and manage all complaints. No complaints were recorded in the complaint management system throughout the review period.

#### 4.1.1 Management Actions undertaken in response to Complaints

No management actions in response to complaints were undertaken within the review period, as no new complaints were received.

### 4.2 Incidents

Unfortunately, during the review period, five eagle mortalities were detected during routine carcass monitoring. Each incident was subject to a formal incident investigation, which included input from external eagle experts, a full necropsy including x-rays and toxicity sampling, and separate investigations as to the cause of the mortalities from review of IDF data by Goldwind and the US based IDF team.

These incident investigations confirmed none of the eagle tracks detected by IDF could have led to the mortality, and it was concluded that the IDF Stations in the area had not seen the eagles at all due to the low altitude of the eagle flights, and visual occlusion from trees. As the eagles were not detected by IDF, no curtailment signal was issued.

#### 4.2.1 Environmental Incidents Notified to Regulators

Table 4.1 shows the incidents within the review period which triggered the requirement for reporting to EPA and the Commonwealth under the project's conditions of approval.

Table 4.1: Incidents Notified to Regulators within the Review Period.

Date	Species	Turbine	Identified Root Cause of Mortality Following Incident Investigation
18/07/22	Wedge Tailed Eagle	46	Occlusion from trees prevented IDF from detecting low flying eagle
24/08/22	Wedge Tailed Eagle	42	Occlusion from trees prevented IDF from detecting low flying eagle
29/08/22	Wedge Tailed Eagle	46	Occlusion from trees prevented IDF from detecting low flying eagle
13/09/22	Wedge Tailed Eagle	38	Occlusion from trees prevented IDF from detecting low flying eagle
11/04/23	Wedge Tailed Eagle	1	Occlusion from trees prevented IDF from detecting low flying eagle

Further background and context relating to the above mortalities is provided in Section 4.2.2.

#### 4.2.2 Root Cause of Mortalities and Preventative Actions Undertaken

##### IdentiFlight Coverage and Site Constraints

Within the area occupied by the wind farm, commercial forestry activities have been discontinued, and a large section of forest adjoining Lake Echo’s eastern shore, where Turbines 41-48 are located (‘the forest section’ in this report) is now used commercially by the landowner, as a carbon offset. Removal of vegetation is not permitted within the Carbon Forest, and this has limited WCHPL’s ability to achieve the level of visibility around all turbines required by IDF for full protection.

The IDF system installed at CHWF included sixteen IDF towers mounted on 7m towers, one of which was subsequently modified to a 10m tower. Each of the stations ‘observe’ one or more wind turbines and can issue curtailment signals for those turbines. Turbines are considered ‘fully covered’ if the IDF Station has full visibility of the turbine, tower, and surrounding airspace. If this cannot be achieved, turbines are considered ‘partially covered’ by that IDF station but may be fully covered by another IDF station. The IDF stations and turbines they cover are shown in Table 4.2.

The 16 IDF stations were carefully sited to maximize protection of the CHWF’s 48 turbines, however finding a suitable location for IDF-3 was problematic. During micrositing, IDF advised that IDF-3 could not be installed at its intended location between Turbines 46 and 47, as the close proximity of tall trees in this area would distract the cameras.

Due to the site constraints associated with the Carbon Forest, IDF-3 had to be relocated to another site with sufficient distance to surrounding trees, and within 400m of Turbine 47, which had been designed to supply power to IDF-3.

Table 4.2: Wind Turbines Observed by IDF Stations.

IDF Station	Connected Wind Turbine	Wind Turbines Observed by Station
IDF 1	Turbine 40	25, 26, 27, 34, 40, 41, 42
IDF 2	Turbine 44	35, 36, 37, 42, 43, 44, 45, 46
IDF 3	Turbine 47	37, 38, 39, 45, 46, 47, 48
IDF 4	Turbine 38	29, 31, 32, 35, 36, 37, 38
IDF 5	Turbine 25	24, 25, GW26, 27, 40, 41
IDF 6	Turbine 29	18, 26, 27, 28, 29, 30, 31, 34, 35
IDF 7	Turbine 33	30, 31, 32, 33
IDF 8	Turbine 16	16, 17, 24, 25
IDF 9	Turbine 19	18, 19, 20, 21, 22
IDF 10	Turbine 23	20, 21, 22, 23
IDF 11	Turbine 11	10, 11, 12, 13, 14, 15
IDF 12	Turbine 8	7, 8, 9, 10
IDF 13	Turbine 7	5, 6, 7, 8
IDF 14	Turbine 4	4, 5, 6
IDF 15	Turbine 2	1, 2, 3
IDF 16	Turbine 1	1, 2

The best of the available options to relocate IDF-3 was a small clearing within the forest a greater distance away, with reduced visibility of several of the Turbines IDF-3 was designed to observe. The new location met IDF requirements for the Station to operate and track birds, but resulted in Turbines 42, 45, 46, 37, and 38 only being able to achieve partial coverage from IDF-3. The incident investigations undertaken for three deceased eagles found near Turbine 46, revealed that Turbine 46 has a significant blind spot extending from 110m ASL to ground level. Significant occlusions were also identified for Turbines 42 and 45.

To date, seven of the eight WTE mortalities which have occurred are associated with vegetation screening preventing IDF from detecting a low flying bird, therefore no curtailment signal was issued. Six of the eight mortalities are associated with Turbines covered by the relocated IDF-3.

#### 4.2.3 Management Actions resulting from Incident Investigations

Table 4.3 summarises actions proposed following each mortality to date showing the actions which have been implemented and their effectiveness addressing the root cause. As the table shows, mitigation actions are being undertaken for each mortality, and at Turbines where these actions have been completed, there has been no recurrence of further mortalities.

Table 4.3: Mitigation Actions for WTE Mortalities and their Effectiveness Preventing Recurrence

#	WTG	Date	Identified Root Cause following Incident Investigation	Mitigation Measures Implemented	No recurrence of mortalities	
					Days	Years
1	2	9/09/20	Operator accidentally restarted turbine during IDF stop.	Turbine controls reconfigured so IDF stop cannot be manually overridden. Root cause eliminated all turbines.	1,113	3.05
2	45	29/06/21	Vegetation obstruction prevented IDF from detecting low flying eagle – no curtailment signal issued by IDF, no evidence of a collision event, or failed detection.	Seven trees removed between IDF-2 and T45 which resulted in significant improvement in visibility of T45 from IDF-2. IDF commenced work on a new model for mapping vegetation occlusions, which was nearing completion at the end of the review period (Figure 4.2).	820	2.25
3	46	8/09/21	Vegetation obstruction prevented IDF from detecting low flying eagle – no curtailment signal issued by IDF, no evidence of a collision event, or failed detection.	Additional IDF station on taller tower proposed. Drone work undertaken to identify location and design height of tower (30m).	436	1.19
4	46	18/07/22	Screening from forest prevented IDF from detecting low flying eagle – no curtailment signal issued by IDF, no evidence of a collision event, or failed detection. Evidence of recent injuries from an eagle attack.	Additional 30m IDF station project ongoing – location of tower finalized, tower design commenced, and planning permit application lodged with Council.	261*	0.69
5	42	24/08/22	Vegetation obstruction prevented IDF from detecting low flying eagle – no curtailment signal issued by IDF, no evidence of a collision event, or failed detection.	Four (non-protected) trees between IDF-2 and T42 were removed to improve visibility of T42 from this IDF-2. Following removal, visibility of T42 was noted to have significantly improved, however this turbine is still considered partially covered.	401	1.10
6	46	29/08/22	Vegetation obstruction prevented IDF from detecting low flying eagle – no curtailment signal issued by IDF, no evidence of a collision event, or failed detection.	Following the third mortality at T46, the turbine was immediately shut down during daylight hours to prevent recurrence. During the review period, a Planning Permit for the proposed 30m IDF station was obtained from CHC, design and construction of the tower was completed, and commissioning had commenced.	261*	0.69
7	38	13/09/22	Vegetation obstruction prevented IDF from detecting low flying eagle – no curtailment signal issued by IDF, no evidence of a collision event, or failed detection.	IDF settings changed however these rely on IDF seeing the bird - primary mitigation is taller tower which will see over canopy towards T38	375	1.04
8	1	11/04/23	Vegetation obstruction prevented IDF from detecting low flying eagle – no curtailment signal issued by IDF, no evidence of a collision event, or failed detection.	Ongoing. At the time of writing, landowner permission to remove obstructing vegetation has been provided and quotes from local contractors are in the process of being obtained.	169	0.46

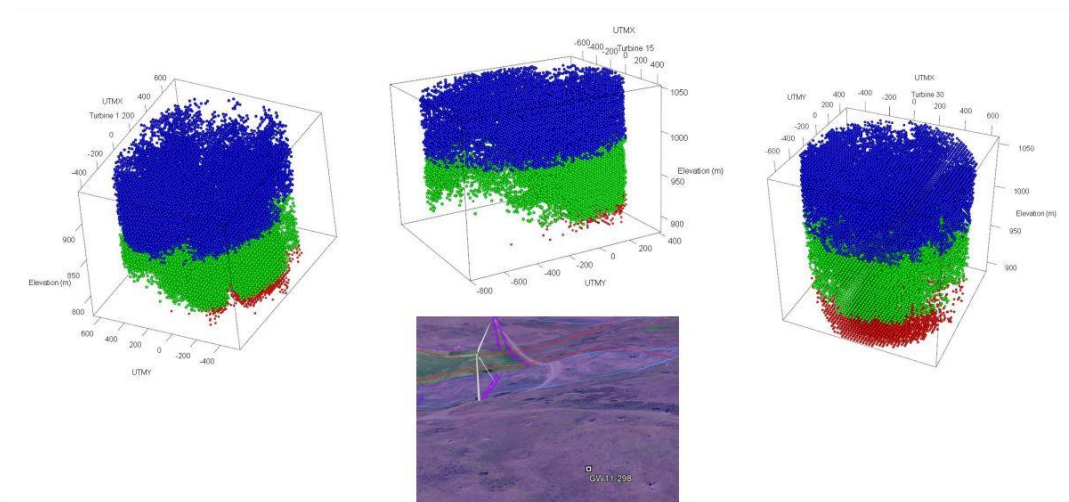
\* Note, at the time of writing, the mitigation action for T46 (taller 30m tower) had not been completed however preventative actions were undertaken in the interim to reduce the risk of further mortalities while the 30m tower project was ongoing. Preventative actions involved voluntary shut down of T46 during daylight hours during high-risk periods, in consultation with EPA.

Figures 4.1 and 4.2 shows two mitigation actions undertaken during the review period to further reduce risk of eagle collisions in areas poorly covered by IDF:

- Figure 4.1 shows the additional 30m IDF station being installed following the discovery of three deceased eagles near Turbine 46 which IDF was unable to detect due to occlusion from trees.
- Figure 4.2 shows the improved approach to identification of vegetation occlusions affecting turbines, developed by IDF in response to eagle mortalities within the forest section.

*Figure 4.1: New 30m IDF tower installed as mitigation for mortalities at Turbine 46.*

*The new tower will have clear visibility of T46 (shown above) and will significantly improve visibility of Turbines 42, 45, and 38, which are only partially covered by IDF due to vegetation occlusions.*



*Figure 4.2: Example of improved approach to identification of vegetation occlusions implemented by IDF as a mitigation action following WTE mortalities during the review period.*

### 4.3 Waste Management

#### 4.3.1 Waste Volumes Generated during Review Period

Waste volumes generated during the review period were similarly low to the previous year and are expected to remain low for the remainder of the operational life of the wind farm, as only a small team is present on site. Table 4.4 summarizes waste volumes generated during the review period.

Table 4.4: Total Waste Volumes Generated during Review Period

Category	Volume	Treatment / Disposal Method
Solid Wastes		
General waste	114 cubic metres	Launceston Landfill
Liquid Wastes		
Sewerage (amenities)	N/A	AWTS System Serviced and Maintained by Professional Plumbing
Controlled Wastes		
Hydrocarbon (total)	Zero	N/A
Empty oil drums	Zero	N/A
Waste grease	5 x 44-gallon drums	Delivered to Tasmania Oil for disposal.

#### 4.3.2 Waste Strategies Implemented within Review Period

The approach to managing waste on site remains focused on avoiding, reducing, and reusing waste, in accordance with the waste hierarchy, as outlined in the approved OEMP but due to the low volumes and absence of local recycling facilities options are limited.

One opportunity identified during the review period which is the process of implementation is the salvage and re-use of steel components from a decommissioned met mast tower on an adjoining landowner property. The salvaged steel will be cut into sections and used at CHWF to install upgraded calibration targets supplied by IDF as part of ongoing improvement of the IDF system.

#### 4.3.3 Inventory of Hazardous Goods

Condition H4 of EPN 10105/1 requires an inventory to be kept of all environmentally hazardous materials stored and handled on The Land, specifying the location of storage facilities and maximum quantities of hazardous materials held. This is provided in Appendix C.

As most of the hazardous materials held on site during construction of the wind farm have since been removed, only minor volumes of hazardous materials are held on site; these are limited to those required to operate and maintain the wind farm.

### 4.4 Changes to Environmental Procedures or Processes within Review Period

No changes to environmental procedures and processes were adopted during the review period.

### 4.5 Compliance Breaches

Due to misinterpretation of the OEMP review requirement ('two months prior to the date of commissioning and every three years thereafter') the three yearly OEMP review was not completed by the required time and will be submitted during the next review period.

No other compliance breaches occurred during the review period.

## 5 Implementation of Environmental Management Plans

### 5.1 Management Plans required by Approval Conditions

The CHWF operates in accordance with various management plans approved by State and Commonwealth regulators. Table 5.1 outlines the plans relevant to wind farm operations and implementation activities undertaken within the review period.

Table 5.1: Approved Management Plans and associated Implementation Actions within Review Period

Condition reference / Title of Plan		Approval	Activities Within Current Review Period
Plans required by State EPN			
DC2	Decommissioning and Rehabilitation Plan	29/07/22	<ul style="list-style-type: none"> <li>Approval of DRP by EPA</li> </ul>
G9	Emergency Response Plan	03/04/20	<ul style="list-style-type: none"> <li>Meetings with TFS, and SES in preparation for the-upcoming fire season.</li> </ul>
G11	EMP (Operations)	06/08/19	<ul style="list-style-type: none"> <li>Ongoing implementation of management plans</li> </ul>
FF5	Eagle Nest Productivity Monitoring Plan	30/10/17	<ul style="list-style-type: none"> <li>On site nest checks undertaken as required.</li> </ul>
FF6	Post Commissioning Eagle Utilization Management Plan	06/02/18	<ul style="list-style-type: none"> <li>Completion of the two-year period of post commissioning eagle monitoring required by the EUMP.</li> </ul>
FF7	Hunting and Culling Management Plan	20/11/18	<ul style="list-style-type: none"> <li>Collation of Records provided by Shooting Groups.</li> </ul>
FF10	Bird and Bat Mortality Monitoring Plan	26/03/19	<ul style="list-style-type: none"> <li>Main and pulse surveys of 24 turbines each month.</li> </ul>
FF15	Eagle Mortality Offset Plan <sup>2</sup>	21/12/18	<ul style="list-style-type: none"> <li>Annual payment of \$75,000 and payments for WTE mortalities during review period made to WTE research fund.</li> </ul>
FF16	Turbine Shutdown Management Plan	24/08/18	<ul style="list-style-type: none"> <li>TSMP not triggered within review period</li> </ul>
Plans required by Commonwealth EPBC Approval			
6A	Collision Avoidance Detection Plan	29/05/18	<ul style="list-style-type: none"> <li>Revised CADP submitted to Commonwealth (Aug 22).</li> <li>IDF in operation throughout review period.</li> <li>Additional 30m IDF station constructed in response to mortalities at turbines only partially covered by IDF.</li> </ul>
22	Weed Management Strategy	14/12/17	<ul style="list-style-type: none"> <li>Monitoring of priority weeds and treatment as required</li> </ul>
23	Flora Offset Management Plan	10/08/19	<ul style="list-style-type: none"> <li>Monitoring required by FOMP undertaken.</li> <li>Fence established around Bashan ledge orchid covenant.</li> <li>Formal registration of covenants on land titles ongoing.</li> </ul>

Activities relating to the above plans are discussed in more detail in the following sections.

<sup>2</sup> Also addresses EPBC conditions 16 – 19 (inclusive)



## 5.2 Management Plans required by State EPN

### 5.2.1 CHWF Operational Environmental Management Plan

The OEMP describes the elements of the Environmental Management System (EMS) which Wild Cattle Hill Pty Ltd (WCHPL) is implementing and continually improving in order to avoid, mitigate, and manage potential environmental impacts associated with operation of the CHWF. High level objectives (and intended outcomes) of the OEMP are to:

- Protect the environment by preventing or mitigating adverse environmental impacts.
- Facilitate efficient conduct of activities in accordance with environmental conditions.
- Assist the organization in the fulfilment of compliance obligations.
- Enhance environmental performance.
- Communicate environmental information to relevant interested parties.

The OEMP has been developed to enable the project to achieve these outcomes by:

- Establishing an EMS framework to enable WCHPL to protect the environment and respond to changing environmental conditions in balance with the project operational requirements.
- Setting out details of each relevant environmental aspect (specific issues) and the management controls for potential impacts in respect of each specific issue.
- Establishing objectives and targets for environment protection and biodiversity conservation.
- Compiling all environmental aspects, management strategies, and compliance requirements for CHWF operations in a single, clearly presented, and accessible reference document.

The OEMP is in the process of being revised in accordance with the review specified (2 months prior to the date of commissioning and every three years thereafter), however due to misinterpretation of the requirement, the review has not been finalized in the required time. Other OEMP related actions during the review period are summarized as follows:

### 5.2.2 Eagle Nest Productivity (in and around wind farm site) Monitoring Plan

Condition FF5 of the State EPN required the preparation of an Eagle Nest Productivity Monitoring Plan (ENPMP) prior to construction. The ENPMP approved by EPA requires undertaking activity and productivity checks of eagle nests within and outside the wind farm each year, as described below:

#### On Site Nest Checks

Eagle nests within the wind farm were checked by VDC during the review period 2022 in accordance with *Forest Practices Authorities Fauna Tech Note No. 1 - Eagle nest searching, activity checking and nest management*<sup>3</sup>. All nests were approached and examined from previously established vantage locations designed to avoid disturbance of nesting eagles.

While the ENPMP defines ‘on-site’ nests as those within 2 kilometers of turbines, a broader scope of nest checks is undertaken each year. Figure 5.1 shows the seventeen nests recorded on NVA within 4 kilometers of the CHWF, fourteen of which are checked by VDC every year. Nests which are not checked include RND 872 on the western bank of Lake Echo, RND 490, a recorded nest which does not exist, and RND 1320, which is 3.5 kilometers outside the wind farm’s northern

<sup>3</sup> [http://www.fpa.tas.gov.au/\\_data/assets/pdf\\_file/0012/110208/Fauna\\_Tech\\_Note\\_1\\_Eagle\\_nest\\_management\\_May\\_2015.pdf](http://www.fpa.tas.gov.au/_data/assets/pdf_file/0012/110208/Fauna_Tech_Note_1_Eagle_nest_management_May_2015.pdf)



boundary, and 4.3 kilometers from the nearest turbine. The activity status of these nests is drawn from searches undertaken by others.

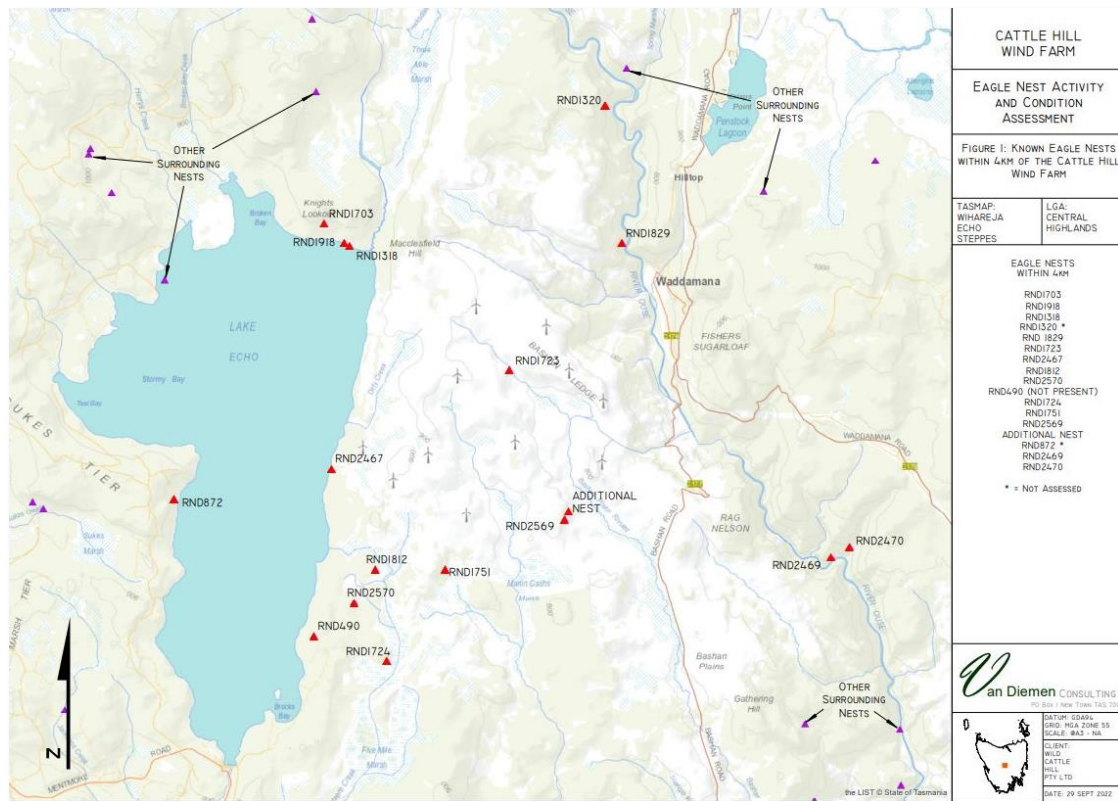


Figure 5.1 – Known nests within 4km of CHWF.

Figure 5.2 shows the activity status of nests from checks undertaken in 2022. Two nests which were inactive in 2021 were active in 2022, including Additional Nest which is inside the boundary of the CHWF, approximately 1.2 kilometers from Turbine 1, and RND 1724, which is just outside the boundary of the CHWF, approximately 3 kilometres from the nearest turbines (38 and 48).

RND1318, the WBSE nest on the northern shore of Lake Echo was active in 2022, as it was in 2021, when an increase in WBSE activity on site was noted from eagle tracks generated by IDF. Since 2021, IDF has regularly tracked WBSE movements through CHWF heading to and from this nest.

RND2467, the closest eagle nest to any turbines within the CHWF, was established after construction of the wind farm had commenced. The nest was active in 2018/2019 and successfully fledged just prior to the Great Pine Tier fires which resulted in a TFS directed evacuation of the CHWF in early 2020. Since that time, RND 2467 has not been active, however regular fighting between WTE and WBSE occurs in this area.

As RND2467 is less than 1000m from the additional 30m IDF station being installed in the forest section of the wind farm to address the IDF visibility limitations referred to elsewhere in this report, an early nest check was undertaken to ensure construction of the new station would not disturb an active eagle nest. These checks confirmed RND2467 was not active throughout construction of the new IDF station, however construction was completed in late August, and the earliest RND2467 has ever been active has been September. The status of RND2467 and other nests will be further assessed in the upcoming November nest checking period.

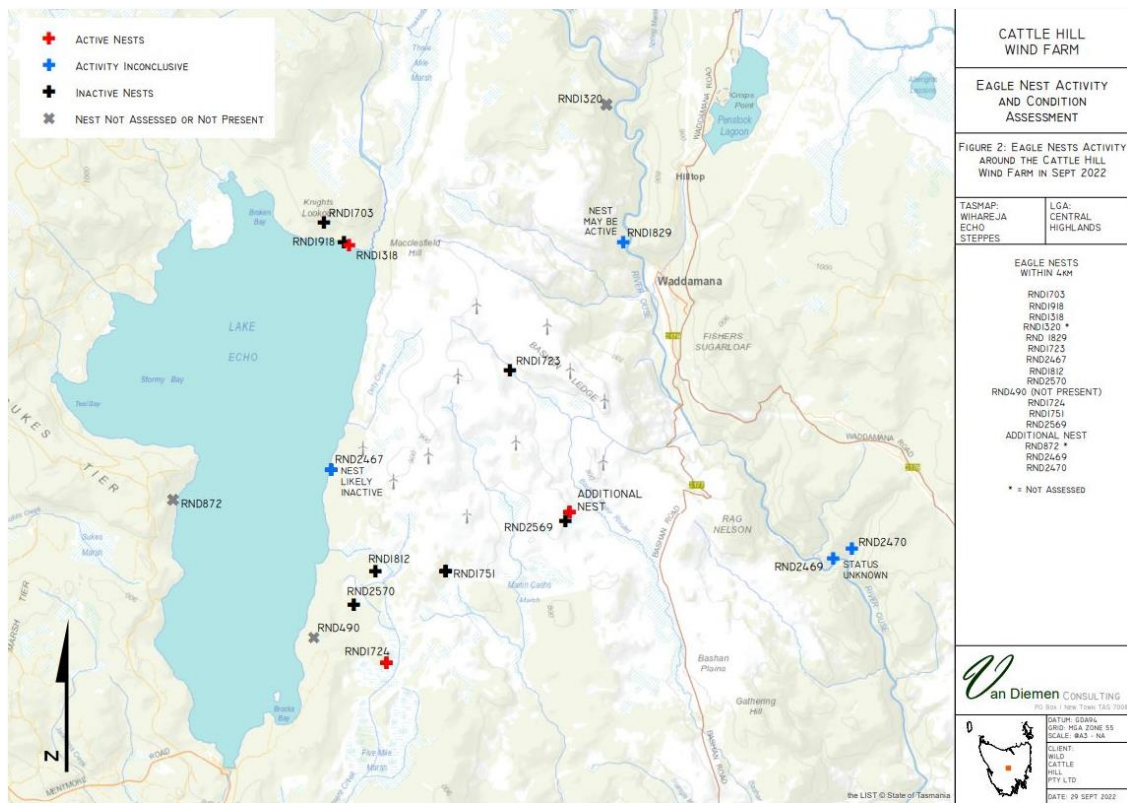


Figure 5.2 – Activity status of known nests from checks undertaken during 2022.

### 5.2.3 Post Commissioning Eagle Utilization Monitoring Plan

The Post Commissioning Eagle Utilization Monitoring Plan (EUMP) developed in response to Condition FF6 of the EPN, outlines the requirement for two years of post-commissioning eagle utilization monitoring at the below periods, for comparison with equivalent monitoring undertaken before construction of the CHWF began.

- Breeding season (8 days in mid-November)
- Breeding season (3 days in mid-December)
- Post breeding (4 days in late February)
- Non-breeding (5 days in early May)
- Display period (6 days in Mid-August).

During the review period, the two-years of eagle utilization monitoring was completed by Wildspot, following the same methodology as the pre-construction monitoring (also carried out by Wildspot) and a report provided by summarizing the findings. Some of the key findings from the report are summarized below and correlate with observations from review of IDF data (see Section 7).

- A higher level of eagle flight activity was observed in the post-construction surveys compared to the pre-construction surveys.
- The pre-construction and post-construction surveys at Cattle Hill Wind Farm showed a distinct difference in the spatial distribution of eagle flight activity. In pre-construction surveys, flight activity was focused on a single point in the central NE region associated with an active nest. In

contrast, post-construction surveys showed higher activity levels spread out on the NE and SW edges and to the south of the site.

- High eagle activity was concentrated in specific areas, with the highest activity observed near Turbines 7-9 and 11-12 (NE of the site) and Turbines 46-48 and 38, 39 (SW of the site). These active areas are possibly due to a combination territorial defence in relation to neighbouring eagle pairs, strong updrafts, active nesting sites, and rich food resources.
- The Tasmanian WTE was the most common species, accounting for the majority of flights. The WBSE was less common, likely due to the location away from their preferred marine habitat.
- The highest conflict and displaying behaviour was observed during the eagle breeding season, particularly in the month of August.

Figures 5.3 shows the results of eagle monitoring conducted by Wildspot, indicate a pattern of highest eagle activity near Bashan ledge (NE of the site) and the forest section (SW of the site).

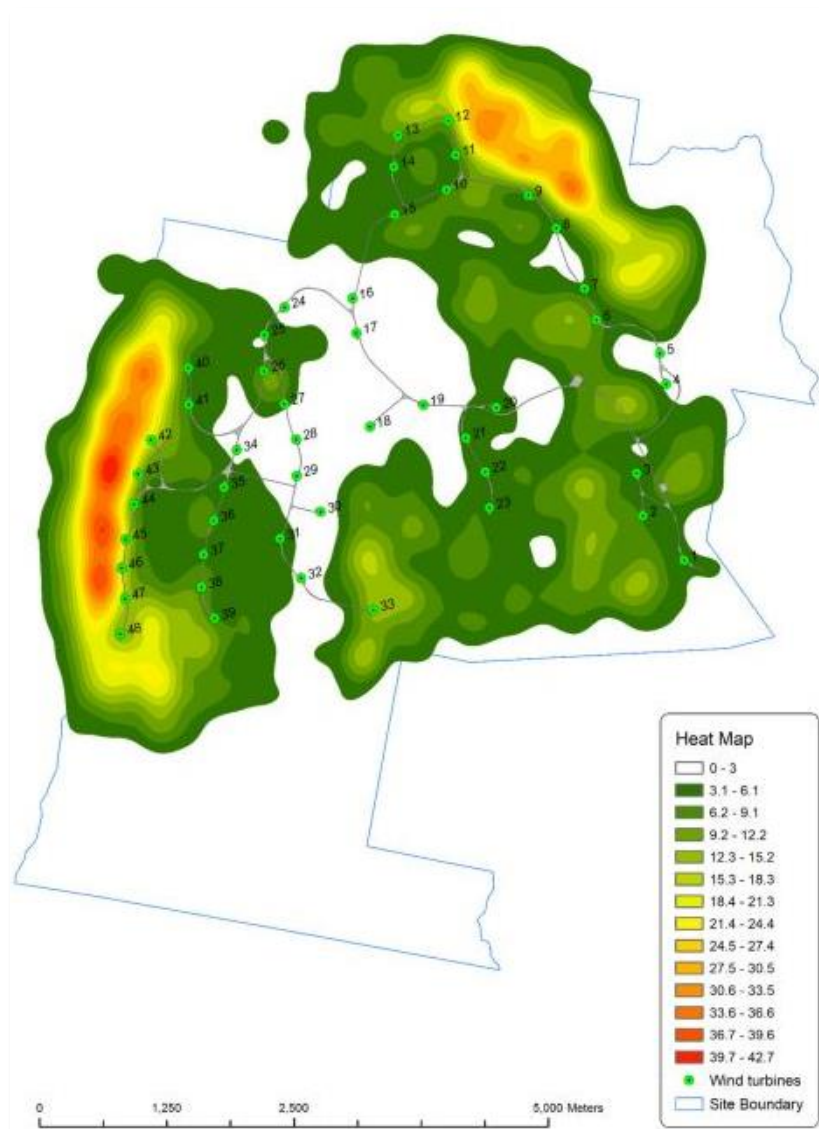


Figure 5.3: Kernel density per hectare of WTE and WBSE activity at CHWF from the 2020-2021 survey period, including observation data from November, December, February, May, and August for 569 observed flights (Wildspot, 2022).

### 5.2.4 Hunting and Culling Management Plan

The Hunting and Culling Management Plan (HCMP) was developed in accordance with Condition FF7 of EPN 10105/1 and Commitment 126 of the DPEMP. In parallel, Conditions 3 and 4 of the EPBC approval required the location of four carcass disposal pits within the wind farm to be approved by the Commonwealth Minister responsible for administering the *EPBC Act 1999*. These pits were established prior to construction of the wind farm at the approved locations more than 500 meters from the nearest wind turbine and are referred to as (Top Ridge, Mushroom, Bashan, and Five Mile). Placement away from turbines was designed to reduce Eagle Collision risk.

During the previous review period, a change to the management of carcass pits occurred in consultation with DAWE and EPA, to enable compliance with the *Animal Health Act*. The pits, predominantly used by Hunting and Shooting groups operating on behalf of the landowners, had previously been left open, with the view that this would provide a similar food source for eagles to that prior to the wind farm, however they are now covered following use within 48 hours (or sooner) to comply with the requirement of the *Animal Health Act* for covering of carcasses.

### 5.2.5 Bird and Bat Mortality Monitoring Plan

The Bird and Bat Mortality Monitoring Plan (BBMMP) addresses requirements of EPN Condition FF10 and has been approved by EPA. The Plan stipulates requirements for monitoring at Carcass Monitoring Zones (CMZ) beneath each turbine, and the procedures to be carried out following discovery of any injured or dead bird or bat species.

Throughout the review period, detailed surveys of 24 turbines per month were carried out using trained detection dogs ('Phase 2 surveys'), searching the area around each turbine, out to 120m. Within three days of each Phase 2 survey, 'Pulse' surveys were undertaken, searching the inner 60m carcass monitoring zone around each turbine.

The results of these searches are summarised in the following graphs and tables.

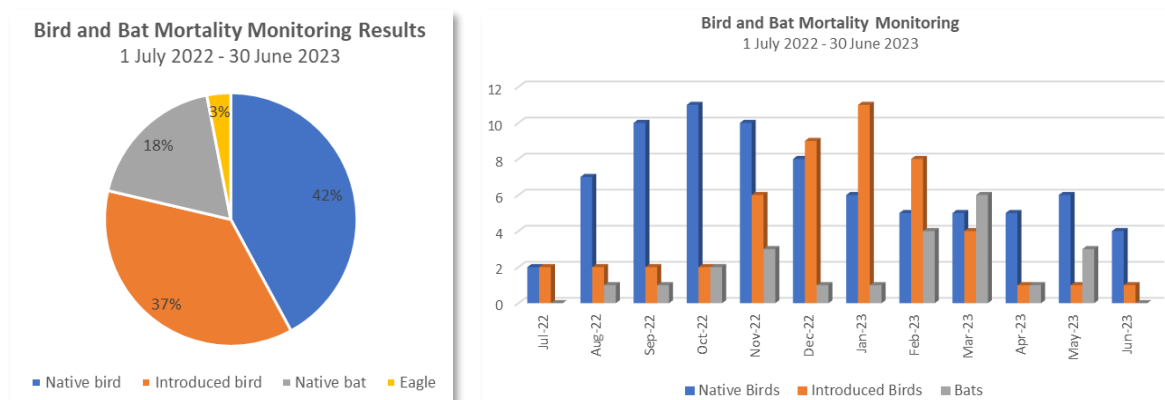


Figure 5.4: Bird and bat species detected by carcass monitoring at CHWF during the review period.



Table 5.2: Bird species detected during carcass monitoring.

Species	Count	Percent
Australian Magpie	7	6%
Australian Wood Duck	4	3%
Ballion's Crake	1	1%
Black Currawong	5	4%
Blue Winged Parrot	2	2%
Brown Falcon	6	5%
Crescent Honeyeater	1	1%
Eastern Rossella	4	3%
Eurasian Skylark	9	8%
European starling	37	32%
Flame Robin	2	2%
Gallinula Sp	1	1%
Green Rosella	2	2%
Grey Currawong	4	3%
Horsefield's Bronze Cuckoo	2	2%
Native Robin	1	1%
New Holland Honeyeater	1	1%
Noisy Miner	1	1%
Rossella Sp	1	1%
Shining Bronze Cuckoo	1	1%
Spotless Crake	1	1%
Spotted Pardolote	2	2%
Striated Pardolote	5	4%
Tasmanian Silvereye	3	3%
Tree Martin	4	3%
Wedge Tailed Eagle	5	4%
White Faced Heron	1	1%
Yellow Wattlebird	3	3%

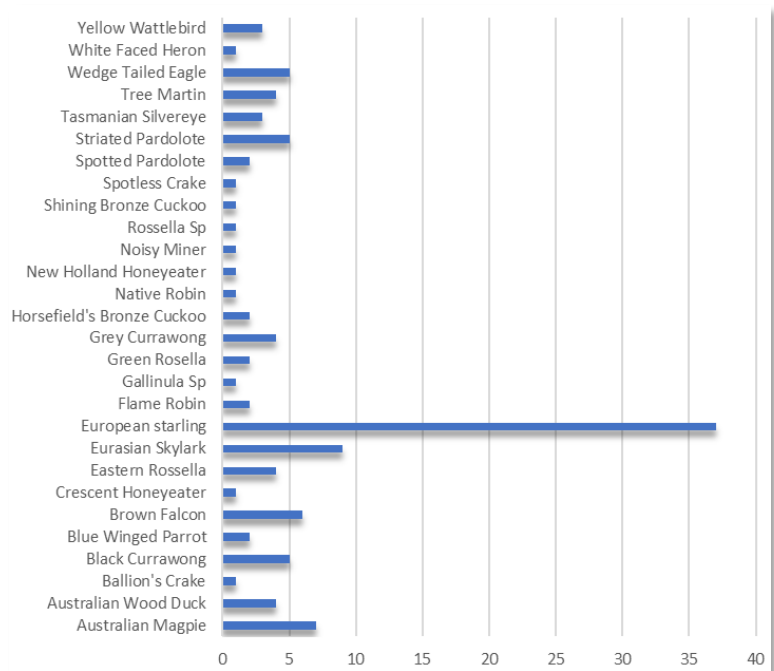


Figure 5.5: Bird species detected during the review period.

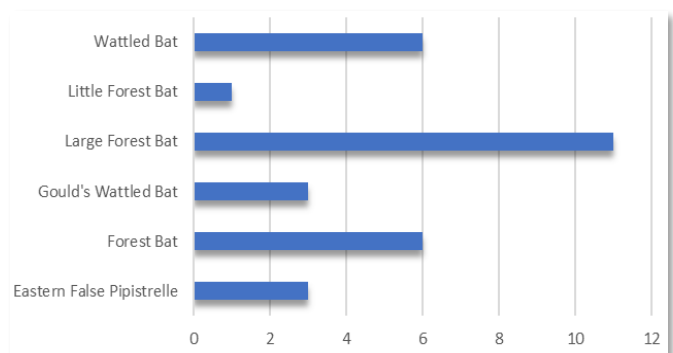


Figure 5.6: Introduced birds the European Starling and Eurasian Skylark accounted for 38% of bird mortalities detected during the review period.

Table 5.3: Bat species detected by carcass monitoring.

Species	Count	Percent
Eastern False Pipistrelle	3	10%
Forest Bat	6	20%
Gould's Wattle Bat	3	10%
Large Forest Bat	11	37%
Little Forest Bat	1	3%
Wattle Bat	6	20%

Figure 5.7: Bat species detected by carcass monitoring.



Data from carcass monitoring to date indicates operation of the CHWF has resulted in the following bird and bat mortality levels on a per turbine / per year basis:

- 0.10 Wedge Tailed Eagle mortalities.
- 0.00 White Bellied Sea Eagle mortalities.
- 1.65 Native bird species mortalities.
- 1.02 Introduced bird species mortality.
- 0.48 native bat mortalities.

These figures are well below the reported industry average bird/bat mortalities for large turbines<sup>4</sup> (5-7 birds per turbine/year and 7-10 bats per turbine/year).

Despite the significant increase in eagle utilization and eagle nests within and outside the CHWF site since pre-construction monitoring was conducted, eagle mortalities remained below predicted mortality levels outlined in Attachment 3 of the State EPN.

#### 5.2.6 Eagle Mortality Offset Plan

The Eagle Mortality Offset Plan (EMOP) developed in accordance with Condition FF15 of EPN 10105/1 requires the following measures to offset eagle impacts associated with operation of the wind farm:

- Placement of a 20ha conservation covenant around five WTE nests outside the wind farm (implemented prior to construction of the wind farm based on predicted mortalities)
- Placement of a 20ha conservation covenant around an additional WTE nest for every WTE mortality in excess of five mortalities; OR
- Annual payments to the Tasmanian WTE research fund established for the project<sup>5</sup>.

During the review period, annual contributions to the WTE research fund were made which are being used to further the understanding of the Tasmanian WTE.

#### Eagle Research supported during the Review Period

The WTE research fund is independently managed by NRM South and allows qualified researchers to apply for funding to support WTE research meeting fund objectives.

The major projects supported during the review period are summarised below:

***Investigation the spatial ecology and habitat use of Tasmania wedge-tail eagles in the Tasmanian Midlands using high-frequency GPS telemetry.***

This project will provide information on the spatial ecology and resource use of adult Tasmanian wedge-tailed eagles in the agricultural area of the Tasmanian Midlands. Furthermore, the data from this project will be combined with data from other GPS-tracked eagles across Tasmania to provide a state-wide understanding of how the species uses different landscapes. The insight into the importance of different habitats and the spatial modelling of this information will address two research priorities identified in the Tasmanian wedge-tailed eagle recovery plan (Threatened Species Section, 2006) and by the Technical Advisory Committee.

<sup>4</sup> VIC ARI 2020 data

<sup>5</sup> Joint requirement of the EMOP (EPN Condition FF15 3.3) and EPBC Approval Notice Condition 17

**Comprehensive analysis of the exotoxin threat to Tasmanian Wedge-Tail Eagles**

The aims of this research are to estimate the prevalence of ecotoxin exposure across the Tasmanian wedge-tailed eagle population, the magnitude of potential demographic impacts of ecotoxins and the source of the ecotoxins. This research builds on the work of Dr James Pay (Pay, Katzner, Hawkins, Barmuta, et al., 2021; Pay, Katzner, Hawkins, Koch, et al., 2021) that observed a high frequency of ecotoxin exposure in wedge-tailed eagle carcasses from around Tasmania.

In relation to the above research project, samples were collected for WTE mortalities at the CHWF, and results were returned during the review period. The results show that of the eight mortalities which have occurred at the CHWF to date, five of the eagles had elevated levels of lead. The levels were so high the vet concluded these eagles must have been ingesting lead throughout their entire lifetime.

It is unclear if, or to what extent the lead levels may have contributed to the mortalities discovered at CHWF, however the results suggest a broader underlying issue for WTEs in Tasmania.

The NRM South 2023 Annual Research Fund report is provided in full as Appendix D to this AER.

Further details can be found at: <https://www.nrmsouth.org.au/wedge-tailed-eagle-research-fund/>

**5.2.7 Turbine Shut Down Management Plan**

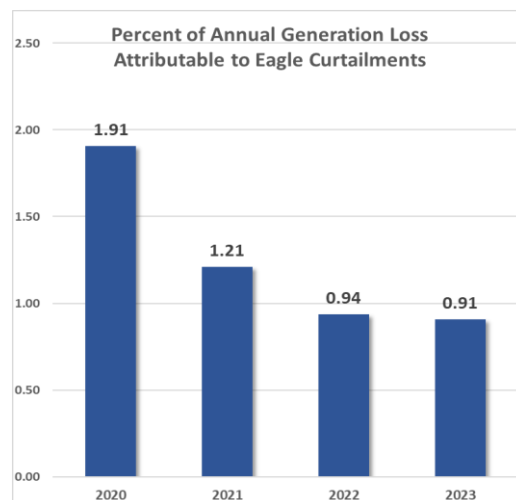
The Turbine Shut Down Management Plan (TSMP) developed in response to Condition FF16 of the State EPN outlines how turbine shutdown provisions will be used to mitigate eagle collision risk associated with operation of the wind farm, and consists of two main elements:

- Tracking turbine shut down hours against a 12-month rolling average target of 4,292 hours;
- Actions to be implemented if maximum predicted mortalities are breached<sup>6</sup>.

Turbine shut down hours are tracked daily and used as indicators of project efficiency and seasonal eagle activity within the wind farm.

Figure 5.8 shows how efficiency of IDF curtailments has improved each year at CHWF, despite increased eagle utilization of the site.

Figure 5.8: Despite increased eagle utilisation of CHWF, IDF efficiency has improved each year since installation in 2020.



<sup>6</sup> Outlined in Attachment 3 of State EPN 10105/1



Table 5.4 – Comparison of IDF data during the review period vs all-time data collected (3.8 years)

	2020	2021	2022	2023
Average Daily Curtailment Count	459	427	475	486
Total Curtailment Count	13,562	12,674	14,240	13,855
Maximum Daily Curtailment Count	902	857	1,037	941
Maximum Daily Curtailment (Hours)	49.44	38.39	25.85	23.98
Average Daily Curtailment (Hours)	22.16	16.12	11.18	11.31
Average Duration of Curtailments (Minutes)	3.08	2.10	1.44	1.42
Total Curtailment Duration (Hours)	640	479	338	297
Eagle Images	161,254	300,058	298,232	326,231
Other Bird Species Images	34,096	69,635	74,531	71,967
Maximum Eagle Height AGL (m)	1,031	1,011	990	949
Average Eagle Height (m)	200	216	229	180
Observed Eagle Flights (Minutes)	3,120	3,748	3,289	3,827
Total eagle flight time (Hours)	52	62	57	61

### 5.2.8 Decommissioning and Rehabilitation Plan

Condition DC2- of the EPN 10105/1 outlines the requirement for a Decommissioning and Rehabilitation Plan (DRP) to be approved by the Director, EPA, within three years of commencement of construction (by 4 August 2023). The DRP was submitted to EPA during the previous review period and approved during the current review period on 27 July 2023.

The purpose of the DRP is to provide surety on decommissioning and rehabilitation activities to be undertaken when the end of operational life of the CHWF has been reached. The context for the CHWF is that full operation of the wind farm commenced on 4 August 2020 and operations are expected to continue for about 25 years (approx. 2045).

As the CHWF is at an early stage in its operational life cycle and given the legislative changes and technological advancements likely to occur over the operational life of the wind farm (for example blade recycling), the DRP will be revised on a five-yearly basis, consistent with the Clean Energy Council Best Practice Guidelines for Wind Farms<sup>7</sup>.

## 5.3 Management Plans required by Commonwealth EPBC Approval

### 5.3.1 Collision and Detection Avoidance Plan

The Collision Avoidance and Detection Plan (CADP) was developed in response to Condition 6A of EPBC Approval 2009/4839 and together with Conditions 1 to 5 and 10 to 20 of the EPBC Approval, provide a range of measures to protect the Endangered Tasmanian Wedge-Tailed Eagle (WTE). The EPBC Conditions complement provisions of the EPN that provide protection for the WTE.

The CADP is specific to the Endangered Tasmanian WTE and was preceded by a report titled *'Strategies for monitoring bird and bat collisions'* required by Condition G9 of the State EPN. That

<sup>7</sup> Best Practice Guidelines for Implementation of Wind Energy Projects in Australia, Clean Energy Council, June 2018.

report assessed existing technologies which could be applied at wind farms to reduce risk of eagles colliding with turbines and led to the selection of IDF for an 18-month technology trial. Findings of the trial can be found at this link: [Assessment of the IdentiFlight Avian Detection System \(cattlehillwindfarm.com\)](https://cattlehillwindfarm.com/Assessment-of-the-IdentiFlight-Avian-Detection-System)

Condition 6c of the EPBC Approval Notice required the CADP to be updated following completion of the trial and revised, if necessary, based on the trial outcomes. A revised CADP was submitted to the Commonwealth in March, following the IDF trial which had showed IDF to be effective, with zero eagle mortalities at all turbines fully 'covered' by IDF stations. The revised CADP highlighted some areas for improvement to reduce eagle risk at turbines only partially covered, and outlined WCHPL's intention to continue operating IDF as the best technology, approach or method of reducing risk to eagles, based on the effectiveness of the system to date.

Following the eagle mortalities during the review period, which further highlighted the significance of vegetation screening, a further revision to the CADP is being prepared, to incorporate the 30m IDF Station as the primary mitigation measure to address this issue.

### 5.3.2 Flora Offset Management Plan

The Flora Offset Management Plan (FOMP) required by Condition 23 of EPBC Approval Notice 2009/4839 was approved on 27 July 2019. The FOMP includes specific monitoring and management conditions and requirements for three areas which were identified for protective covenants to offset potential impacts to EPBC listed orchid species Liawenee Greenhood (*Pterostylis pratensis*) and Crowded Leek Orchid (*Prasophyllum crebriflorum*) associated with construction of the wind farm.

Two of the three protective covenants are located outside the CHWF, and one is within the CHWF in an elevated area dominated by Highland Poa grasslands to the west of Turbine 7 (Bashan Ledge Covenant). Once fully enacted, the provisions of the covenant are designed to protect known habitat or occurrence of the following conservation significant species, in perpetuity:

- Highland Poa grassland - a State threatened vegetation community.
- Crowded leek orchid (*Prasophyllum crebriflorum*), an EPBC listed orchid.
- Liawenee greenhood (*Pterostylis pratensis*), an EPBC listed orchid.
- Ptunarra brown butterfly (*Oreixenica ptunarra*) a State and EPBC listed invertebrate.
- Clover glycine (*Glycine latrobeana*) a State and EPBC listed herb.

During the review period, fencing around the Bashan Ledge covenant was completed, and ongoing monitoring of the health of orchids and other flora species carried out by ecologists VDC in accordance with the approved FOMP. However, the process of formal registration of the covenant between NRE and the landowner remains incomplete.

### 5.3.3 Weed Management Strategy

To control potential for weed infestation and propagation the following measures were implemented during the review period in accordance with the CHWF Weed Management Strategy:

- Annual and targeted weed treatment following approved methodologies.
- Implementation of site requirements to ensure all machinery was brought onto site in clean condition; free of weed propagules, dirt, or vegetative matter.
- Site monitoring and reporting in accordance with the OEMP.

## 5.4 Other Environmental Actions undertaken within Review Period

### 5.4.1 Discaria Covenant

A covenant has been established within the CHWF for protection of the Spiky anchor plant (*Discaria Pubescens*) to account for potential impacts during construction of the wind farm. Spiky anchor plant is listed as endangered under the *Threatened Species Protection Act 1995*.

During the review period, actions were undertaken by NRE to progress the formalization of this covenant, which first required removal of a TasNetworks caveat on the relevant land title to allow the covenant to be registered. This caveat has now been removed and NRE is in the process of formalizing covenant documentation with the landowner.

### 5.4.2 Treatment of Wombats

CHWF has recently partnered with Wombat Rescue to assist and treat wombats suffering from mange. During the review period a mange afflicted wombat was discovered between Turbines 30 and 31. The wombat was in a severely depleted condition, but following treatment has become more agile and is foraging further from its burrow. Any wombat identified as suffering from mange within the within CHWF, is treated by the Site Manager and technicians with support from Wombat Rescue. To date, seven wombats have been successfully treated.



*Figure 5.9: Successful treatment of mange affected wombat, showing the condition of the wombat when found (left) and its improved condition one week later (right).*

### 5.4.3 Onsite Fuel Storage

In March 2023, the CHWF implemented an on-site fuel management system to improve the efficiency and accuracy and site staff refueling their vehicles, noting the considerable distance to the nearest fuel stations.

The new system (photograph B6, Appendix B) will reduce overall travel kilometres associated with operation and maintenance of the CHWF, and in turn, reduce transport related Greenhouse Gas (GHG) emissions associated with the project.

## 6 Community Engagement Activities

### 6.1 Project Communication

Local engagement activities within the review period focused on the Community Fund and facilitating site tours for local groups and schools. The 1800 number, info@ email and project address remained available to contact the project representatives.

#### 6.1.1 Project website

The project website ([www.cattlehillwindfarm.com.au](http://www.cattlehillwindfarm.com.au)) was updated periodically throughout the review period with relevant announcements including details on applying for the Community Fund and successful projects after award.

#### 6.1.2 Dedicated communication channels

A dedicated 1800 phone number and email address for the project was maintained throughout the review period, with [62] enquiries being received via these communication channels. Responses to enquiries were managed in accordance with the project's Enquiries and Complaints Handling Plan.

#### 6.1.3 Project updates in local publications

Project-related advertisements were placed in the local newspaper the Highland Digest in Sept 2022 to promote the opening of the Community Fund.

### 6.2 Community Investment and Funding Initiatives

#### 6.2.1 Local Business Participation Program

CHWF operates under a Local Business Participation Program which facilitates engagement of local suppliers and spans the construction and operations phases. Any enquiries from local businesses are forwarded to the site team for consideration.

#### 6.2.2 Community events and participation

CHWF frequently hosts visits to the wind farm by regulators, politicians, schools and other interested parties. Details are provided below of some of the visits which took place during the review period.

#### **Emergency Services Site Familiarisation Tour**

The site team hosted an 'Emergency Services Site Familiarisation Tour' in January 2023, initiating a proactive approach to efficient emergency management on this remote Tasmanian site, while also strengthening relationships with local emergency personnel.

Guests were initially taken through a presentation covering relevant site information, site specific hazards and access in an emergency, before group discussions were held on various emergency scenarios that may occur. This was followed by a site tour, with the group visiting a turbine, along with the substation and the Lake Echo water access point that is available for Tas Fire Service to use in the event of a bushfire. Over 30 Police, Fire, Ambulance and State Emergency Services personnel attended (Figure 6.1).





Figure 6.1: Emergency Services Site Familiarisation Tour, January 2023.

### Girls in Power Career Exposure Event

In May 2023, CHWF hosted Hydro Tasmania’s second Girls in Power career exposure event welcoming 30 young women in years 9 and 10, along with teachers and support staff to site (Figure 6.2).



Figure 6.2: Girls in Power career exposure event, May 2023.

Students were given a tour of the operations and maintenance facility and a presentation on the IdentiFlight technology. The students also took part in a workshop activity to design and make miniature turbines from cards, corks, and wooden skewers. Each group tested their designs, using a fan and multimeter to determine which blade design produced the highest voltage output.



### 6.2.3 Attendance at Community Events

As part of the first round of our Community Fund in 2021, CHWF donated \$30,000 to the Great Lake Community Centre in Miena, Tasmania. These funds contributed to the upcoming new building project - consisting of a Community Makers Shed, and what is expected to be the country's largest Passive Solar Greenhouse.

On 16<sup>th</sup> January 2023, CHWF representatives from both Goldwind Australia and Power China, attended the projects 'Sod Turning Ceremony' signifying the commencement of the building works (Figure 6.3).



Figure 6.3: Sod-Turning Ceremony, Great Lake Community Centre Redevelopment project, January 2023.

CHWF supported the local Sheep Station Cup in February 2023, a local golf competition which raises funds for local causes. Representatives of CHWF attended the event.

### 6.2.4 Community Fund Round Two

CHWF opened Round Two of the annual Community Fund in August 2022.

A dedicated website page provided information on how to apply including Fund guidelines, application information and templates to assist local groups. The funding process was run through Smarty Grants, with applications open 14 September 2022.

The Round was advertised in local newspaper the Highland Digest and shared online via e-newsletter and local communication channels. Information was also provided to Council to spread the word and encourage applications through local channels.

Seven applications for funding were received and an Assessment Panel consisting of community members and CHWF representatives determined the successful applicants.

CHWF was pleased to support five community projects through Round Two of the Fund:

In addition, CHWF provided funding support to the Bothwell Bicentennial Festival in October 2022.

Round Three of the Community Fund will take place in the next review period.

## 7 Identiflight

### 7.1 Overview and Current Status

Identiflight system (IDF) is designed to detect eagle movements and shut down turbines when eagles are approaching turbines, to reduce the risk of collision. The system was installed as part of a technology trial in accordance with the Collision Avoidance and Detection Plan (CADP) approved by the Commonwealth in accordance with Condition 6A of the EPBC Approval Notice.

IDF has now been in continuous operation for 3.8 years, including 8.5-months of wind farm commissioning, with turbines progressively coming online, followed by approximately three years of full wind farm operation. During this time, IDF has tracked over 500,000 eagle movements and captured over 12 million eagle images. Over 600,000 curtailments have been instigated to reduce risk to eagles, at an average of 444 curtailments per day.

#### 7.1.1 Observations from Review of Identiflight Data

Data from IDF has shown that during the colder months, particularly the period from June to early September, average eagle flight heights are lower, and fall beneath rotor tip height (Figure 7.1). Seven of the eight WTE mortalities at CHWF have occurred during this period, suggesting WTEs may be more at risk of collision during colder weather.

#### Eagle Flight Heights

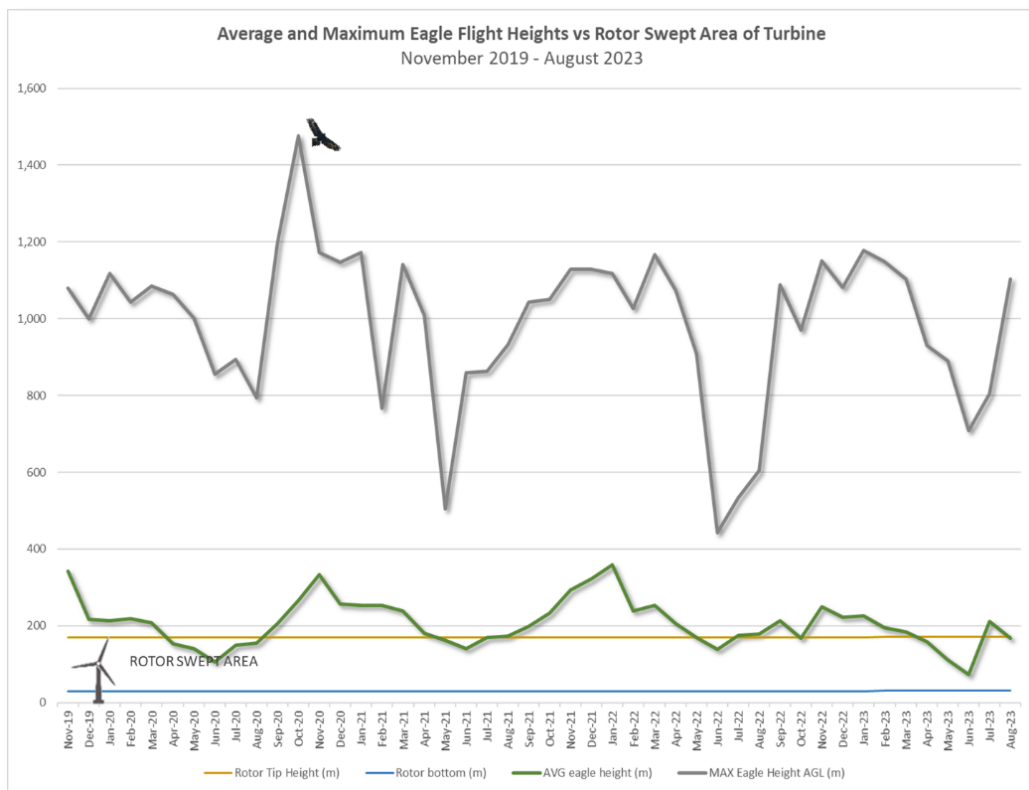


Figure 7.1: Average and Maximum Eagle Flight Heights versus Rotor Tip Height.

### Eagle Activity

The earliest and latest eagle observations captured by IDF each month (Figure 7.2) shows WTE activity is closely aligned with the rise and fall of the sun, and is highest between December to February, and lowest between June to August. All WTE mortalities at CHWF have been detected during the period of low activity and occurred on cold days with very low bird activity on site.

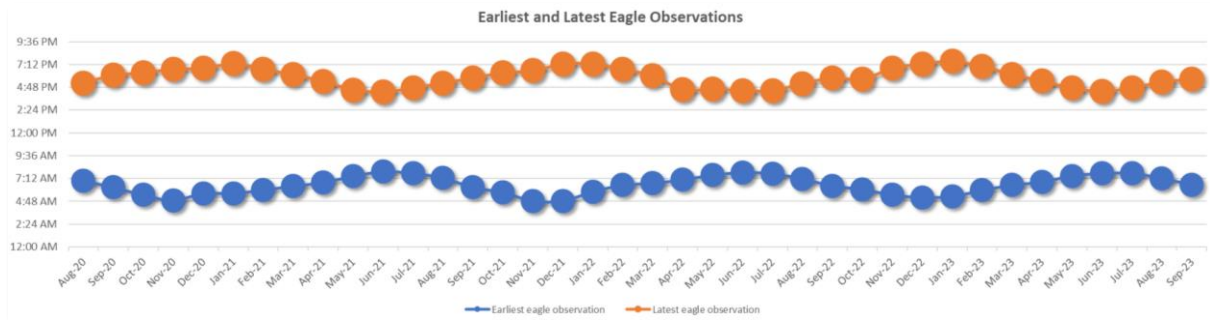


Figure 7.2: Earliest and Latest Eagle Observations captured by IDF.

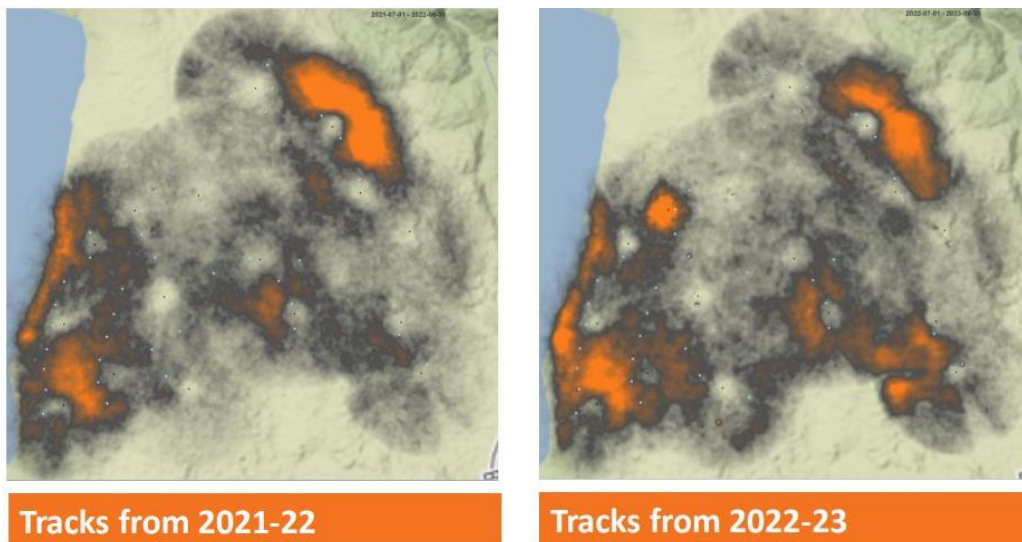


Figure 7.3: Heat maps of eagle activity generated by IDF which show highest activity in the NE of the site near Bashan ledge, and SE of the site (forest section).

### Eagle Conflict

In contrast to the pre-construction eagle utilization monitoring, which recorded minimal observations of eagle conflict, IDF has shown fighting between eagles is a regular occurrence. Evidence of eagle conflict was discovered during incident investigations for three WTE mortalities to date, most notably the second WTE mortality near Turbine 46 in July 2022 where the necropsy revealed a gash on the head and lacerations to the body from a recent fight, and eagle prints were visible in the snow next to the deceased eagle.

The cause of this mortality was reported as turbine related due to the proximity of the deceased eagle to Turbine 46, however IDF has since shown conflict can result in a fall from the sky and collision with the ground near turbines, despite being unrelated to turbine operation (Figure 7.3).

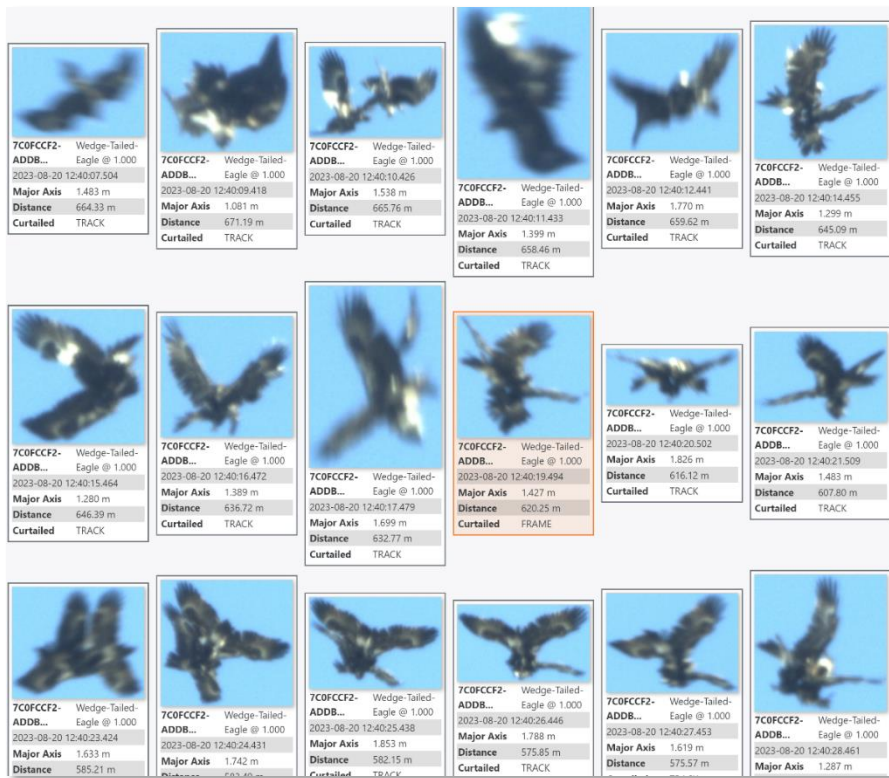


Figure 7.4: Eagle attack captured by IDF which resulted in an eagle colliding with the ground 500m from Turbine 1.

## 8 Fulfillment of general commitments

The project OEMP (operations phase) outlines general and specific environmental management commitments for the project which are based on the conditions of approval for the CHWF. General commitments considered to have been fulfilled (within the review period) are shown in Table 8.1.

A more detailed review of specific commitments is provided in Appendix E.

Table 8.1 Fulfillment of general environmental commitments

General Environmental Commitment	Fulfilled
Comply with the GWA environmental policy	✓
Conduct environmental risk workshop in advance of operations phases commencing	✓
Ensure staff and contractors are aware of all planning and environmental constraints	✓
Periodically evaluate compliance with the conditions of approval	✓
Ensure all staff and contractors are appropriately trained and qualified to carry out their duties	✓
Implement the CHWF complaints plan and maintain records of complaints	✓
Make relevant information available to the public including via the CHWF website	✓
Maintain adequate records to demonstrate compliance with Commonwealth, State and Local approvals	✓
Maintain all biodiversity related data on the Cattle Hill Project GIS and the Natural Values Atlas	✓
Maintain inventory of hazardous goods stored and used on site	✓
Notify all significant environmental incidents to appropriate regulators within specified timeframes	✓
Carry out regular site environmental inspections for monitoring compliance with conditions of approval	✓
Carry out program of environmental and compliance audits during operations	✓
Submit Annual Environmental Review to the Director, EPA each year by 30 September	✓
Submit annual EPBC compliance summary report to the Commonwealth by 11 November each year	✓
Carry out other statutory notifications within the timeframes specified in the OEMP	✓
Conduct annual reviews and identify opportunities to improve performance	✓
Implement all plans in accordance with the approved versions	✓



## 9 Changes to the Activity over the next 12 months

The major activities that will occur at the wind farm over the next 12 months are ongoing implementation of the Operational Environmental Management Plan, ongoing site management and inspections, ongoing implementation of the IdentiFlight system and ongoing implementation and review of approved management plans required by the conditions of approval:

A major focus for the site will be continuing to refine and improve the effectiveness of the IdentiFlight technology, including the 30m taller tower described in this AER, to mitigate the risk of collision of eagles with wind turbines, following identification of a number of 'blind spots' within the forested section of the wind farm, where tall trees limit the ability of IdentiFlight cameras to see eagles. This is considered to present increased risk during the colder months when eagles are flying at lower altitudes.

Clearance of forest vegetation adjoining CMZs and near turbines is not permitted under the current EPN and is prohibited within areas protected as Carbon Forest, which complicates the ability to effectively mitigate eagle risk. IDF visibility of turbines, and eagle's visibility of turbines, particularly transient eagles, is expected to present an ongoing challenge for the site.

Key activities to be undertaken between 1 July 2023 and 30 June 2024 are shown below:

### Operational Activities

- Ongoing inspections and maintenance of wind farm infrastructure
- Ongoing maintenance of SCADA and Communications infrastructure.

### IdentiFlight Activities

- Ongoing tracking and monitoring of IdentiFlight data
- Ongoing inspections and maintenance of IdentiFlight infrastructure
- Ongoing assessment of opportunities to improve performance and reduce risk to eagles
- Completion of rollout of the White Bellied Sea Eagle Neural Network across the wind farm
- Installation of upgraded magnetic calibration targets throughout the site
- Software updates and improvements initiated by IDF, as required
- Ongoing sharing of lessons with and interested stakeholders.

### Activities required by EPN 10105/1

- Ongoing implementation of the EMP (Operations) required by (Condition G11)
- Five-year review of the EMP (Operations) required by (Condition G11)
- Ongoing monitoring required by the Bird and Bat Mortality Monitoring Plan (Condition FF10)
- Ongoing monitoring required by the Eagle Nest Productivity Monitoring Plan (Condition FF5)
- Ongoing record keeping required by the Hunting and Culling Management Plan (Condition FF7)
- Notifications and reporting of incidents as required.

### Activities required by EPBC Approval Notice 2009/4839

- Finalisation of the revised Collision Avoidance and Detection Plan (Condition 6c).
- Ongoing implementation of the Weed Management Strategy (Condition 22).
- Ongoing monitoring in accordance with the Flora Offset Management Plan (Condition 23)
- Notifications and Incident Reporting as required.

## APPENDIX A

### EPN Condition G10 requirements for Annual Environmental Review

## Requirements for Annual Environmental Review

*1 Unless otherwise specified in writing by the Director, a publicly available Annual Environmental Review for the activity must be submitted to the Director each year within three months of the end of the reviewing period. Without limitation, each Annual Environmental Review must include the following information:*

*1.1 a statement by the General Manager, Chief Executive Officer or equivalent for the activity acknowledging the contents of the Annual Environmental Review;*

*1.2 subject to the Personal Information Protection Act 2004, a list of all complaints received from the public during the reviewing period concerning actual or potential environmental harm caused by the activity and a description of any actions taken as a result of those complaints;*

*1.3 details of environment-related procedural or process changes that have been implemented during the reviewing period;*

*1.4 a summary of the amounts (tonnes or litres) of both solid and liquid wastes produced and treatment methods implemented during the reviewing period. Initiatives or programs planned to avoid, minimise, re-use, or recycle such wastes over the next reviewing period should be detailed;*

*1.5 details of all non-trivial environmental incidents and/or incidents of non-compliance with permit or environment protection notice conditions that occurred during the reviewing period, and any mitigative or preventative actions that have resulted from such incidents;*

*1.6 a summary of the monitoring data and record keeping required by these conditions. This information should be presented in graphical form where possible, including comparison with the results of at least the preceding reviewing period. Special causes and system changes that have impacted on the parameters monitored must be noted. Explanation of significant deviations between actual results and any predictions made in previous reviews must be provided;*

*1.7 identification of breaches of limits specified in these conditions and significant variations from predicted results contained in any relevant DPEMP or EMP, an explanation of why each identified breach of specified limits or variation from predictions occurred and details of the actions taken in response to each identified breach of limits or variance from predictions;*

*1.8 a list of any issues, not discussed elsewhere in the review, that must be addressed to improve compliance with these conditions, and the actions that are proposed to address any such issues;*

*1.9 a summary of fulfilment of environmental commitments made for the reviewing period. This summary must include indication of results of the actions implemented and explanation of any failures to achieve such commitments;*

*1.10 a summary of any community consultation and communication undertaken during the reviewing period; and*

*1.11 strategic consideration of potential changes to the activity during the next 12 months that may have potential environmental impacts.*

## **APPENDIX B**

### **Photographs from the current review period**

## Photographs taken during review period



*Photograph B1: Foundation for taller tower*



*Photograph B2: Foundation and tower pre-lift*





*Photograph B3: Tree clearance to improve visibility of target turbine 46*



*Photograph B4: Lifting the tower*



*Photograph B5: Installed 30m IDF Tower (IDF 17-45)*



*Photograph B6: On-site refuelling system implemented at CHWF in March 2023.*

## APPENDIX C

# Hazardous Substances Inventory

## Hazardous Substances Inventory, CHWF Operations Phase

Chemical Name	Storage QTY	UN No	Haz Chem Code	DG Class	Location
50GM Pressol Graphite	25g	-	-	-	Workshop
Atherton Chemicals Protek Priming Fluid Red	125ml	1193	2YE	3	
Atherton Protek Type N Clear Solvent Cement	125ml	1133	3YE	3	
BASF Storm Secure Wax Block Rodenticide	1.5kg	-	-	-	
Cabac EJCC/220	880g	-	-	-	
ChemTools R28 Nickel Antiseize	500g	-	-	-	
Chemtools SG Silver GAL Aerosol	800g	1950	-	2.1	
Jif – Lemon	500ml	-	-	-	
Citro Clean Multipurpose Cleaner	500ml	1993	3Y	3	
CRC 3013 Soft Seal – Aerosol	400g	1950	-	2.1	Workshop
CRC 3055 808 Silicone Spray	5.2kg	1950	2YE	2.1	
Dow Corning Molykote P-74 Paste	20kg	-	-	-	
Epirez Safe Step100	4L	1263	3Y	3	
Galmet ColdGal Aerosol	400g	1950	-	2.1	
Hogans Tradesman Touch Up Paint	400g	1950	-	2.1	
Inox-mx3	70L	1950	-	2.1	
Liberty Unleaded Petrol	20L	2103	3YE	3	Workshop DG cabinet
Shell Omala S4 GX 150	60L	-	-	-	
Loctite 243	750ml	3082	3Z	9	Workshop
Molykote G-N Paste	10.5kg	3077	-	9	
Total Oil Equivis ZS 32	205L	-	-	-	
WD-40 Aerosol	400g	1950	2YE	2.1	
Petroleum Hydrocarbon	500ml	-	-	-	
PEM Cutting Oil	4L	-	-	-	
Quick Spray	6 cans	1950	2YE	2.1	
Wire Rope & Cable Lubricant	570g	1950	-	2.1	
Wax and Grease Remover	5 litres	1268	3YE	3	
Galmet Ironize	2L	-	-	-	
Diesel	20 litres	3082	3Z	9	
Kerosene	1 pack	2623	1Z	4.1	
Lubricant	1.53kg	-	-	-	
Lubricant	2.4kg	-	-	-	
Bossweld Nozzle Dip Gel	400g	-	-	-	
Acetone		1090	2YE	3	
CRC NF Contact Cleaner	300g	1950	2Y	2.2	
CRC 5.56 Multipurpose	400g	1950	2YE	2.1	
Hunters Settling Day Insect Spray	300g	1950	2YE	2.1	
LB 8060 Silver Grade Anti-seize	20g	1910	-	-	
Anticorrosive Bright Silver Finish	1kg	1950	-	2.1	
Diggers Acetone	7L	1090	2YE	3	
Recochem Acetone	20L	1090	2YE	3	
Isopropanol	14L	1219	2YE	3	
Methylated Spirits	3L	1170	2YE	3	
Petroleum Gas Liquefied	5kg			2	

## APPENDIX D

# Wedge Tailed Eagle Research Fund 2023 Annual Report (NRM South)



# Wedge-tailed Eagle Research Fund 2023 Annual Report



Photo: Dr Eric Woehler

*Prepared for Wild Cattle Hill Pty Ltd*

*Date: 28<sup>th</sup> September 2023*

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## Glossary

ANU	Australian National University
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
EMOP	Eagle Mortality Offset Plan
FPA	Forest Practices Authority
NRET	State Department of Natural Resources and Environment Tasmania
TAC	Technical Advisory Committee
UTas	University of Tasmania
WTE	Wedge-tailed Eagle, <i>Aquila audax fleayi</i>

## Introduction

This is the fourth Annual Report for the Wedge-tailed Eagle (WTE) Research Fund ('The Fund'). It discusses the achievements since the last Annual Report in September 2022.

The Fund has been operating in accordance with requirements and is enabling the support of high-quality research on Tasmanian Wedge-tailed Eagles. It is unlikely this research would have been supported without The Fund. The projects being supported will provide valuable advances in the understanding of the WTE population in Tasmania, which will assist with achieving the conservation outcomes for the subspecies.

## Background

The Cattle Hill Wind Farm was approved by Tasmanian State Regulator in 2012 and by the Commonwealth Department of Environment and Energy (now the Department of Climate Change, Energy, the Environment and Water, DCCEEW) in December 2014. A requirement of the approval of the Cattle Hill Wind Farm (as described in the relevant permit conditions) was to develop an offset plan for wedge-tailed eagles (*Aquila audax fleayi*, WTE).

An Eagle Mortality Offset Management Plan (EMOP) was developed and subsequently approved to satisfy these requirements. The EMOP comprises two components, with the second component describing the Tasmanian WTE Research Fund. The EMOP required that The Fund needed to be established and administered by an independent organisation. NRM South was selected as the administering body for The Fund and a Services Agreement was signed between NRM South and Wild Cattle Hill Pty Ltd on 23<sup>rd</sup> August 2019.

## Objective of The Fund

The Fund is designed to offset the impact of WTE mortalities (or injured WTE that cannot be released into the wild) due to collisions with wind turbines at the Cattle Hill Wind Farm. The Fund will only support research relating to the Tasmanian sub-species of WTE and projects based in Tasmania.

The primary purpose of The Fund is to support high quality ecological or other relevant scientific research on Tasmanian WTE, the results of which will assist with the management and protection of the sub-species. The intention is that The Fund continues for the medium term (at least 10 years), hence not all funds will be expended each year. Research will be supported that is scientifically rigorous, conducted by high quality scientists, and which is in accordance with the objectives of the Threatened Tasmanian Eagles Recovery Plan 2006-2010 or any subsequent eagle Recovery Plan.

## Priorities for The Fund

Research supported by The Fund will be consistent with the published recovery objectives of the "Threatened Tasmanian Eagles Recovery Plan 2006-2010" or a subsequently approved version of the Recovery Plan. The EMOP notes that DoEE (now DCCEEW) have indicated they require The Fund to support key scientific research on the sub-species and not other activities, although the State component of The Fund may support education activities.

Suitably qualified researchers<sup>1</sup> will be eligible to apply for funds to support relevant research on WTE consistent with the below priorities. Critical research that can demonstrate a sound experimental design and statistical rigour will be viewed most favourably.

The initial priorities for funding support are:

- Demography of the WTE. This could include studies into the size of the state population (such as an evidence-based population census), fecundity, survival of different age classes, and immigration and emigration intra- and inter-state. Such ecological data could be used to update a Population Viability Analysis.
- The collection of data that will allow an evaluation of the sub-species conservation status against IUCN criteria.
- Quantification of anthropogenic impacts to WTE, such as collisions with vehicles, powerlines, shooting or poisoning, and the development of mitigation measures to reduce these impacts. ☒ Disturbance to nesting WTE. This includes studies into determining the anthropogenic factors that impact on breeding, and quantification of these such as the distance, duration and types of factors that result in impacts to breeding success.
- Strategies to monitor nesting behaviour of WTE. Nests are currently very difficult to monitor due to the need to limit disturbance to breeding birds, hence automated strategies to monitor nests without disturbing eagles will be supported.
- Studies into why WTE collide with wind turbines and strategies to reduce collision rates. Published studies indicate WTE actively respond to and avoid wind turbines, but occasionally collide. Any insights into why they occasionally collide may assist with strategies to minimise collisions.
- Other scientific studies where it can be demonstrated that the research will provide a demonstrable benefit to the sub-species.

The priorities for funding support may be revised by the panel following any reviews of the EMOP.

Studies on WTEs required for commercial developments (i.e. conditions of a permit, outside offsets) or studies that are the responsibility of Local, State (including Government Business Enterprises) or Commonwealth Government will not be supported.

### Administration of The Fund

NRM South's role is ensure that The Fund is established and administered as described in the Eagle Mortality Offset Plan (EMOP).

Specifically, NRM South's role is to:

- Be responsible for receipt, management and audit of WTE Research Fund.

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<sup>1</sup> Must hold a postgraduate degree in science and evidence of the successful publication of relevant, high quality research in peer-reviewed scientific journals or experience and qualifications deemed by the panel to be evidence of equivalent merit. However, proposals to support high quality Honours research will also be considered.



- Assist with the identification and selection of panel members. The Panel members selected will be agreed by the Tasmanian EPA and delegate of the Commonwealth DCCEEW.
- Host, recruit and administer/support a panel, as prescribed by the EMOP, to prioritise, assess and distribute research funds – approximately two meetings per year.
- Administer reimbursement of panel members reasonable travel costs and hourly payment for attendance at annual meetings.
- Advertise, administer and coordinate research applications, and in conjunction with the panel develop and maintain the assessment process.
- Contract and administer the research funds on behalf of the research panel, including coordination of progress and final reports.
- Provide panel advice and reports to Wild Cattle Hill Pty Ltd and any other contributors to The Fund for preparation and submission to the Regulator (if required).

### Governance of The Fund

The Fund is overseen by an independent Technical Advisory Committee (TAC, referred to in the EMOP as a “Panel”).

As described in the EMOP, the TAC comprises:

- A representative of the Department of NRET (currently Dr Davina Gregory-Dunsmuir, Threatened Species and Conservation Programs Environment. She replaced Dr Rachel Alderman, who left her role at NRET).
- a representative from the administering body, NRM South (Dr Cindy Hull).
- a representative of the DCCEEW (as an observer, Dr Ivan Lawler), and
- at least two scientists experienced in wildlife ecology, with a strong background in research and publishing (Dr Phil Bell and Dr Sarah Munks, both independent consultants with extensive experience working on eagles). These roles were filled following advertising and a competitive selection process. Both of these independent scientists had completed their first term on the TAC and were offered a second term, which they both accepted.

The role of the Technical Advisory Committee (TAC) is to:

- Review funding applications and select those to be supported.
- Monitor the progress of grant recipients, and
- Determine whether to accept research reports (i.e. whether they fulfill the requirements of support).

Individual members of the Technical Advisory Committee are expected to:

- Actively participate in the review, monitoring and reporting of the Research Fund.
- Attend, either in person or by teleconference, twice annual meetings, and additional meetings, if required.
- Provide reliable, relevant, technical and contemporary advice.
- Comply with relevant NRM South Policies and Procedures, including the Code of Conduct, and any specific requirements of The Fund including Confidentiality; and
- Be an advocate for the research Fund’s outcomes.

## Achievements during 2023

The fourth year of The Fund built on the achievements of previous years.

Details of the achievements:

1. The fourth deposit (including the set-up contribution) to The Fund was received from Wild Cattle Hill Pty Ltd On the 8<sup>th</sup> October 2022.
2. NRM South once again reviewed and updated the application process and guidelines for The Fund, which were sent to the TAC for their comment. Although a grant round was not advertised in 2023, as funds had been allocated based on applications from 2022, the application process and guidelines were made ready for implementation in 2024.
3. The final payment for the project “Estimating the population size of the Tasmanian wedge-tailed eagle (*Aquila audax fleayi*) using modern genetic techniques” (ANU and UTas) was made following completion of the project and receipt of the final report.
4. The project “Monitoring wedge-tailed eagle population trends” was completed and the final report received (note that an extension had been sought and approved to complete the work, necessary due to unanticipated delays). The final payment was made in December 2022.
5. The project “Investigating the spatial ecology and habitat use of Tasmanian wedge-tailed eagles in the Tasmanian Midlands using high-frequency GPS telemetry (Pay, Koch, Cameron, Wiersma, Katzner)” continued, with the mid-term payment made in June 2023 following receipt of the interim report.
6. The project “Comprehensive analysis of the ecotoxin threat to Tasmanian Wedge-tailed Eagles (*Aquila audax fleayi*)” also continued, with the mid-term made in July 2023 following receipt of the interim report. A one-month extension was sought for the mid-term report, and the TAC agreed to this.
7. Additional funds were received in June 2023 from Wild Cattle Hill (as a result of exceeding the wedge-tailed eagle mortality threshold). The TAC met to discuss the best use of these funds given that the number of applications to the Fund is declining each year. It was agreed the money would be rolled over to 2024, with a more proactive approach to addressing key priorities through the development of a PhD project. Discussions have commenced with UTas about this potential PhD project.

An analysis by NRM South found that to date the five projects supported by the Fund have focussed either on demography or to a small extent, anthropogenic impacts. The priorities that have received little or no attention, but remain a priority are:

- Quantifying other anthropogenic impacts
- Factors causing disturbance to breeding eagles
- Factors causing wind farm collisions.

A key priority is to understand what sort of disturbance impacts breeding eagles, including the proximity, intensity, duration and type of noise that impacts breeding birds. It would also be of value to determine the consequences of this impact, to breeding success.

It is planned that the details of a potential PhD project will be developed with key researchers, the TAC and academics at UTas as soon as possible. NRM South is also awaiting feedback from NRET about this approach.

## Projects supported in 2023

The following projects were underway in 2023:

*“Investigation the spatial ecology and habitat use of Tasmania wedge-tail eagles in the Tasmanian Midlands using high-frequency GPS telemetry”* for full funding from:

- Dr James Pay (UTas) Project Lead.
- Dr Amelia Koch (FPA)
- Prof Elissa Cameron (University of Canterbury)
- Jason Wiersma (FPA) and
- Dr Todd Katzner (USGS).

This project will provide information on the spatial ecology and resource use of adult Tasmanian wedge-tailed eagles in the agricultural area of the Tasmanian Midlands. Furthermore, the data from this project will be combined with data from other GPS-tracked eagles across Tasmania to provide a state-wide understanding of how the species uses different landscapes. The insight into the importance of different habitats and the spatial modelling of this information will address two research priorities identified in the Tasmanian wedge-tailed eagle recovery plan (Threatened Species Section, 2006) and by the Technical Advisory Committee.

*“Comprehensive analysis of the ecotoxin threat to Tasmanian Wedge-Tail Eagles”* from:

- Dr De Stojanovic (ANU)
- Dr James Pay (UTas)
- Dr Catherine Young (ANU), and
- Adam Cistern (ANU).

The aims of this research are to estimate the prevalence of ecotoxin exposure across the Tasmanian wedge-tailed eagle population, the magnitude of potential demographic impacts of ecotoxins and the source of the ecotoxins. This research builds on the work of Dr James Pay (Pay, Katzner, Hawkins, Barmuta, et al., 2021; Pay, Katzner, Hawkins, Koch, et al., 2021) that observed a high frequency of ecotoxin exposure in wedge-tailed eagle carcasses from around Tasmania.

## Findings of recently completed projects

### 2021

Two projects supported in 2021 have now been completed. Below is a summary of their key findings.

*“Estimating the population size of the Tasmanian wedge-tailed eagle (Aquila audax fleayi) using modern genetic techniques”* was fully funded.

Summary from the final report (note that analysis of the broader dataset is continuing):

We were aiming to study eagles that had most or all of their 95% UD over land managed under the Nature Conservation Act 2002. Even though we targeted larger areas of reserved land (>30 km<sup>2</sup>)

with eagle nests within the reserved area, it is difficult to predict the size and shape of the areas used by the birds after the transmitter is attached. So far, the 95% UD for four of the eagles tracked for this project are mostly over reserved land (72 – 95% of the 95% UD over reserved land). William's 95% UD had the lowest overlap with reserved land (52%), which may be due to his UD being calculated from only six days of data (the size and shape of his 95% UD is likely to change substantially with more data). However, William was also caught closer to the edge of reserved land than the other eagles, as the trapping stations we had further within Mount William National Park were not visited by any wedge-tailed eagles during the field work. We therefore plan to target an additional bird within reserved land (a reattempt at trapping the pair at Strathgordon) using funds from the wider project aiming to track 50 birds across the state. Interestingly all five of the eagles being GPS-tracked had a lower proportion of their 50% UD over reserved land compared to their 95% UD. Although we have limited data, which is also biased to periods outside of the breeding season, this suggests the eagles are focusing the core areas of their home range to the edge of the reserved land.

#### Habitat selection

When we have the full dataset we will be able to investigate fine-scale behaviour-specific habitat selection using state-space modelling incorporating a number of habitat variables in a multivariate framework. For this report we have explored two habitat variables using a habitat selection ratio (Manly et al., 2002). This approach compares the proportion of available habitat types to the proportion of time spent in each habitat. We identified the available habitat area for each eagle using the 95% UD described previously and buffering that area by an additional band that added 5% to the total area. The proportion of time spent in each habitat type was measured as the proportion of GPS fixes that fell within each habitat (to reduce spatial autocorrelation, the six second flight mode data was subsampled to 10 minutes). The resulting selection ratios identify which habitats are being selected. As such, selection ratio values  $< 1$  indicate a habitat used proportionally less than its availability, and ratio values  $> 1$  indicate a habitat used proportionally more than its availability (i.e., a selection ratio of 2 indicates a habitat type used twice as much as expected). The habitat features we considered in this analysis were landcover categories derived from TasVeg (DPIPWE, 2020) and the distance to the reserve edge (DPIPWE, 2015). The eagles used habitats non-randomly ( $p < 0.001$ ), both in relation to land cover categories and distance to the reserve edge. The eagles showed a strong avoidance for landcover classifications of non-native vegetation, residential, and other natural, which were also habitat types that contributed very small areas within the available habitat areas of the eagles. Eagles with any plantation forest within their available habitat area (Blodwyn, Giolla, and Floki) also avoided this landcover type. Dry eucalypt and wet eucalypt forests were generally used by the eagles proportional to their availability, whereas Blodwyn and Giolla selected for areas of non-eucalypt forest. There was a lot of individual variation in how the eagles used other landcover categories. Selection ratios for agricultural areas were particularly varied between individuals, with the selection ratio values strongly driven by the availability of agricultural areas within the available habitat area. For example, William showed a strong avoidance of agriculture because his available habitat area was  $\sim 50\%$  agricultural land and he spent  $\sim 20\%$  of his time in these areas. In contrast, Blodwyn and Bruny showed a strong selection for agricultural areas even though they spent less time in this habitat type ( $\sim 5 - 10\%$ ), because there was much less agricultural land in their available habitat area ( $\sim 8 - 15\%$ ). The selection ratio confidence intervals

for different distances from the reserve edge all overlapped 0, suggesting no significant overall avoidance or selection for any specific distance from the edge. However, there are some trends in the data. In general eagles exhibited a slight avoidance of areas > 1 km within the reserved area, and a slight avoidance of areas > 1 km outside of the reserved areas. The avoidance of areas > 1 km outside of the reserved areas is driven by data from the two eagles that had areas > 1 km outside of a reserved area within their available habitat area (William, who was caught close to the edge of Mount William National Park, and Giolla, whose large home range incorporates areas of Mountain River south of Kunanyi National Park). Four of the eagles either selected positively for areas within 300 m of the reserve edge or used it as much as would be expected from the availability. This may be due to the edges of the reserves being associated with the intersection of open areas and forest edges, which provide good foraging habitat. Blodwyn was the only eagle that avoided any areas outside or close to the edge of the reserved area. This is potentially due to Narawntapu National Park having lots of open areas within the national park that are suitable for hunting.

#### Flight behaviour

For the first few days after the transmitters are deployed, we program them to collect one location fix every 15 minutes. This is to verify the performance of the transmitters before we change the duty cycle to collecting one fix every six seconds when the birds are flying. Floki's transmitter started recording six second flight data July 24th 2021, Giolla's started February 23rd 2022, and both Bruny's and Blodwyn's started March 10th 2022. We have no detailed flight information for William as his transmitter malfunctioned before it was switched to six second data. To carry out some preliminary exploration of the flying behaviour of the birds, we subset all of the GPSfixes recorded whilst the birds were flying. We then segmented this data by individual flight. In total the birds have completed 4228 flights, flying for a total duration of 28,346 minutes (Table 3). The mean duration of a flight was 6.9 minutes. Most GPS fixes recorded during flights were <250 m altitude over ground level (AGL; Figure 13).

*"Monitoring wedge-tailed eagle population trends")* was partially supported.

Summary from the final report:

This report describes work supported by the Wedge-tailed Eagle Research Fund, carried out for a short-term project using data collected by volunteers, following standardised methods, for the annual statewide raptor survey Where? Where? Wedgie! in May 2021. This long-term monitoring effort is designed to maintain a current picture of the conservation status of Tasmanian raptors, and engage the public in effective research and conservation of these species. For the funded project, data recorded during standardised surveys from 90 separate 4 km x 4 km squares across Tasmania were analysed to obtain an index of abundance for the Tasmanian wedgetailed eagle in 2021, relative to the two previous' years data. An occupancy modelling approach was used, estimating a detection probability of 0.15 (95% confidence intervals 0.13-0.18) and a probability of occupancy of 0.77 (95% confidence intervals 0.64-0.86). There is no evidence of any large change in population size between 2019 and 2021, but the surveys and analyses need to be repeated for several more years to obtain an accurate picture of overall population trend.



## Interim results of projects underway

1. *Investigation the spatial ecology and habitat use of Tasmania wedge-tail eagles in the Tasmanian Midlands using high-frequency GPS telemetry.*

Extract from the mid-project report:

We identified potential study areas during Q4 2022 and carried out field work to capture the eagles during April and May 2023. We caught an adult female, “Daisy”, from a site near Conara at 12pm on April 18th. We next caught an adult male, “Winton”, from a site just northwest of Brighton on April 25th. We caught another adult male, “Bow”, from a site at Jericho on April 27th. On May 10th we caught a third adult male, “Julian”, at a site south of Ross, and on May 11th we caught a final adult female, “Emily”, at a site along the western edge of the Midlands study area.

Due to the short period we have been tracking the five Midlands birds, we do not have enough data to complete quantitative analyses. Here we provide a summary of the data collected from the birds so far. The summaries presented here are based on data collected from the date the GPS-transmitters were attached until June 12th, 2023. During this period, we have collected 77,163 location fixes from the five GPS-tracked eagles. Most of these fixes (n = 57,356) are from Winton and Bow, which is a result of an increased level of spatial activity for these two birds compared to the others (as the more flights a bird performs the more time the GPS unit will be recording data at six second intervals). The other three birds have recorded 5,016 – 7,597 location fixes each.

The data collected from the birds indicates that four of the birds are holding territories. Daisy appears to be a bird that has not yet settled in a territory (her plumage at capture suggested she was either an old sub-adult or a young adult). Six days after she was captured, Daisy left the site where she was captured and travelled north. She spent a couple of weeks travelling around Lilydale, and has since headed back down to Epping Forest, around 8 kms from the site where she was captured. The data collected over the coming months will identify when she settles in a territory. We have performed a quick exploratory analysis on the utilisation distribution (UD) for each eagle (following the approach outlined in the methods). The data collected so far indicates a large amount of variation in both the overall (95% UD) and core areas (50% UD) used by the eagles. Winton and Bow have recorded very large 95% UD, with both being around double the mean 95% UD (22 km<sup>2</sup>) we have recorded for other tracked Tasmanian wedge-tailed eagles. Emily has recorded an exceptionally small 95% UD, at only 6.7 km<sup>2</sup>. The 50% UD recorded for the eagles tracked as part of this project are more consistent with the data we have collected from other eagles. As Daisy is not settled in a territory, her UD cannot be compared to the resident birds. Although interesting, these findings are likely to change, as UD are sensitive to the number of fixes and time period used to calculate them (Girard et al., 2002). A full year of GPS data for each individual will allow us to make defensible conclusions on the UD of the birds tracked for this project.

2. *Comprehensive analysis of the ecotoxin threat to Tasmanian Wedge-Tail Eagles*

Extract from the mid-project report:

Applications were made and acquired for the following authorisations, across the months of April and May.

- 1) animal ethics permit from the Australian National University (A2023\_17)
- 2) permit to take threatened fauna for scientific purposes from the Tasmanian Department of Natural Resources and Environment (TFA 23086) with permit authority extensions issued separately from;
  - a) Authority – Crown Lands Act 1976
  - b) Authority – Conservation Covenant C975689 under the Nature Conservation Act 2002
- 3) Forest Activity Permit from Sustainable Timber Tasmania (FAA 2458)

B) During the initial months of April and May we have collated, from the Natural Values Atlas and with in-kind advice from the Forest Practices Authority, the location of greater than 400 nests with a monitoring history in the past 10 years. A sample of nests was sub-selected with the following criteria; 1) position accuracy  $\leq 20\text{m}$ , 2)  $\leq 300\text{m}$  from road, 3)  $\geq$  one occupancy year in past 5 years and 4)  $>$  one monitoring year in past five years. The nests in the final sample (24 nests) were shaped by site access, permissions and the presence of adult eagles at the nest.

C) 24 nests from across Tasmania were sampled. The locations of the 24 sampled nests are presented in Figure 1.

D) Sample preparation has commenced, and sample analysis has been organised with the ICP-MS research facility at the Australian National University.

There was a delay to the commencement of the project, however, the time has been made up and completion is expected as set out in the initial project schedule with a final report by the 29th of February 2024.

## Next stage in The Fund

The next round of grants is expected to be advertised in early 2024. The use of the additional funds will be resolved and implemented during 2024.

## Financial statement

A summary of the financial statement is provided below:

<b>Details</b>	<b>2023</b>	
	<b>Contribution</b>	<b>Costs</b>
Funds received (incl. GST)	\$94,578.94	-
Bank interest	\$383.98	-
Additional funds	\$137,280.00	-
Ongoing administration (8%)	-	\$6,878.47
Advertising	-	\$0
Contractor costs (TAC)	-	\$550
Milestone payments to grant recipients (since September 2022)	-	Final payment Genetics \$10,263 Final payment Where Where Wedgie \$3,234 GPS Midands (1 <sup>st</sup> and 2 <sup>nd</sup> payments) \$65,489.60 Ecotoxins (1 <sup>st</sup> and 2 <sup>nd</sup> payments) \$71,962.40
GST paid	-	\$5,263.14
<b>Total</b>	<b>\$232,242.92*</b>	<b>\$158,377.47</b>

\* Residual funds will be allocated to future grant rounds and the PhD project

## Appendix 1

### Projects awarded support by the Fund - completed

- 2020: Investigating the spatial ecology and habitat use of the Tasmanian wedge-tailed eagle in unmodified landscapes using high-frequency GPS telemetry (Cameron, Pay, Katzner, Koch, Wiersma).
- 2021: Estimating the population size of the Tasmanian wedge-tailed eagle (*Aquila audax fleayi*) using modern genetic techniques (Stojanovic, Cistern, Pay, Burridge, Young, Clarke and Butler).
- 2021: Monitoring wedge-tailed eagle population trends (Hawkins and Potts).

### Projects awarded support by the Fund – underway

- 2022: Investigation the spatial ecology and habitat use of Tasmania wedge-tail eagles in the Tasmanian Midlands using high-frequency GPS telemetry (Pay, Koch, Cameron, Wiersma, Katzner).
- 2023: Comprehensive analysis of the ecotoxin threat to Tasmanian Wedge-Tail Eagles (Stojanovic, Pay, Cistern).

# APPENDIX E

## Summary of Fulfilment of Commitments



Description of Specific Commitment	Timing	Approval Ref	How is Commitment addressed?	Complies?	Responsibility
An Animal (non-eagle) injury and death response procedure will be implemented during operation of the wind farm to maximise the likelihood of an injured animal surviving.	Commencement of operations	EPN FF10 Commitment 84	Animal (non-eagle) Injury and Death Procedure in place via OEMP.	Complies	WCHPL
The approved BBMMP will be implemented during operations and will include a carcass monitoring zone (CMZ) of 110m radius from the centre of each tower.	Commencement of operations	EPN FF10 Commitment 72 Commitment 85	Operations continued throughout the review period in accordance with the approved BBMMP. Note detection dogs are used to conduct surveys and the carcass monitoring zone extends to 120m) which exceeds the requirement.	Exceeds requirement	WCHPL
Collisions with all bird and bat species will be monitored and recorded as part of the BBMMP.	Commencement of operation	EPN -FF10 Commitment 86	Collisions with all bird and bat species are recorded with comprehensive detail for every find as part of ongoing BBMMP compliance. The monitoring and information collected includes introduced species and exceeds the requirement.	Exceeds requirement	WCHPL
Following any injured or dead animal data recorded will be as per the Animal (non-eagle) Injury and Death Procedure and the carcass will undergo post-mortem assessment if possible	Commencement of operations	EPN FF10 Commitment 87	Animal (non-eagle) Injury and Death Procedure in place via OEMP. Five WTE mortalities occurred during the review period and a Necropsy was undertaken for each mortality. Each mortality was subject to a detailed incident investigation by both GWA and Identiflight, and additional blood and tissue samples collected and analysed in addition to the necropsy and x-rays. Note this exceeds the requirement.	Exceeds requirement	WCHPL
If eagle mortalities in any one year exceed the values in Attachment 3 of EPN10105/1, Submit Plan with further mitigation actions to Director	If threshold values exceeded	EPN FF12 Commitment 42	Five WTE mortalities occurred within the review period which exceeded the values in Attachment 3 for the review period. Following the third mortality at T46, this turbine was shut down during daylight hours (voluntarily) as an immediate preventative action, which has prevented further incidents at the time of writing. At the end of the review period, the primary mitigation action to address mortalities unable to be detected by IDF due to vegetation (an additional 30m IDF station) was completed .and in the final stages of data validation prior to operation.	Complies	WCHPL
The approved Collision Avoidance Detection Plan will be implemented including an 18-month trial of the Identiflight system. The results of the trial will be publicly communicated.	Commencement of operations	EPBC 6A1 - 14 EPN FF9	The IDF Trial was completed, and the results published during previous review periods. Within the current review period, the CADP has been implemented ongoing, and is being revised to include reference to the additional IDF station implemented to address IDF blind spots.	Complies	WCHPL

Description of Specific Commitment	Timing	Approval Ref	How is Commitment addressed?	Complies?	Responsibility
Eagle monitoring data and assessments to be provided to EPA within periodic reports or on request.	Annually by 30 September	EPN F10 Commitment 72	Eagle monitoring information has been included within this and previous AERs. More broadly, findings and observations from review of eagle data provided by IDF have been transparently shared and discussed with a wide range of interested stakeholders, including regulators, landowners, community groups, and other wind farm developers.	Exceeds requirement	WCHPL
An annual Eagle Nest Productivity monitoring program will be carried out to check known WTE and WBSE nests onsite and within 10km of the wind farm.	Commencement of operations	EPBC 16-19 EPN FF5 Commitment 69	Eagle Nest Productivity monitoring program commenced in October 2020 (offsite nests) and November 2020 (onsite nests) and continued throughout the review period.	Complies	WCHPL
Two years of post-commissioning eagle utilisation monitoring will be undertaken to determine whether the wind farm has changed eagle utilisation patterns at the site.	Following commissioning	EPN FF6 Commitment 67	Two years of post-operational eagle utilisation monitoring was completed during the review period and a report provided to EPA. The report confirms the observations from IDF data, that eagle utilisation of the site has increased since operation of the wind farm and has not deterred eagles from utilising the site.	Complete	WCHPL
As an offset for potential impacts to Tasmanian WTEs WCHPL will implement the EMOP that provides funding for eagle research.	Prior to completion of commissioning	EPBC 16-19 EPN FF15 Commitment 41	Ongoing contributions were made to the CHWF WTE research fund throughout the review period. The funds have been used to carry out a range of WTE research initiatives relevant to current and emerging WTE issues and knowledge gaps, as detailed in the report within Appendix D.	Complies	WCHPL
20-ha covenants will be secured for 5 active eagle nests during commissioning and, one additional nest protected for each eagle mortality arising from wind farm operations thereafter.	Covenants in place by 30 Sep 2019 <sup>8</sup>	EPBC 16-19 EPN FF14, FF15 Commitment 129	All 5 covenants were secured by Tasmanian Land Conservancy prior to commencement of operation of the CHWF.	Complete	WCHPL
WCHPL will ensure hunting and vermin control activities continue on site through the life of the wind farm, in such a way as to maintain a similar volume of food source as currently occurs.	At all times during operation	EPN FF7	WCHPL has limited ability to control the activities of hunters operating under the direction of landowners, and observations from IDF and site are that the hunting activities and carcass pits within the site are not utilised by eagles as a food source – there is no shortage of preferred eagle prey on site.  The focus for WCHPL to reduce eagle risk, has been on increasing monitoring to ensure no remains from hunting activities are left where they could attract eagles close to turbines. As part of this, the site manager does a full sweep of all turbines, every day, which exceeds the requirement, but has proven worthwhile.	Exceeds requirement	WCHPL
A 40km/hr speed limit will be adopted on site to minimise risk of fauna collisions	At all times during operation	EPN G11 Commitment 83	A 40 km/hr speed limit has been imposed throughout operations with clear signage installed near the entrance to the wind farm.	Complies	WCHPL

<sup>8</sup> EPA 28/6/19

Description of Specific Commitment	Timing	Approval Ref	How is Commitment addressed?	Complies?	Responsibility
Woodpiles will not be left more than 18 months before burning, and burning will take place in autumn to coincide with the non-breeding period for quolls and devils	At all times during operation	EPN G11 Commitment 78	No woodpiles burnt within review period and no woodpiles left for more than 18 months.	Complies	WCHPL
A data collection form for Mammal Den/Nest Observations will be used to standardise data collection for den/nest observations	At all times during operation	EPN G11 Commitment 80	Data collection form in place as part of the OEMP but not required within review period.	Complies	WCHPL
Ecological checks of woodpiles to be burned will occur within 14 days of burning. If the checks identify evidence of use by a quoll or devil EPA and DPIPWE will be consulted for advice.	At all times during operation	EPN G11 Commitment 83	No woodpiles burnt within review period.	N/A	WCHPL
Avoidance and mitigation measures from Tables 8-7 and 8-8 of the DPEMP will be included in site Biodiversity Training modules.	At all times during operation	EPN G11 Commitment 82	Addressed in induction training provided to service team.	Complies	WCHPL
Requirements for <i>Pterostylis pratensis</i> ; <i>Prasophyllum crebrinorum</i> ; <i>Glycine latrobeana</i> and <i>Discaria pubescens</i> will be integrated into each Turbine CMZ Vegetation Management Plan	At all times during operation	EPN G11, F10 Commitment 91-	All known occurrences are mapped in the VCA and excluded on site however none have been found within the CMZ of any turbine.	Complies	WCHPL
Flora & Fauna training provided as part of the OEMP will include management of <i>Ptunarra brown butterfly</i> ; <i>Pterostylis pratensis</i> ; <i>Prasophyllum crebriflorum</i> ; <i>Glycine latrobeana</i> ; and <i>Discaria pubescens</i>	At all times during operation	EPN G11 Commitment 92	Addressed in induction training presentation provided to service team. All team members have also completed Bonorong fauna handling training.	Complies	WCHPL
A qualified botanist will permanently delineate the path of least impact through MSP and MGH communities to be used for carcass searches. Only 1 person will enter these communities per search.	Prior to Carcass Monitoring	EPN G11 Commitment 95	Impacts to MSP and MGH communities was avoided altogether for the purpose of carcass monitoring following surveys by ecologists.	Exceeds requirement	WCHPL
Forest areas within CMZs or adjacent to wind farm infrastructure will not be cleared; but modified to ensure ground visibility then managed as native vegetation with trees saplings and seedlings (<5% canopy cover).	At all times during operation	EPN G11 Commitment 96	Forest areas within or adjacent to CMZ have not been cleared, however it is noted that the proximity of forest to CMZs, which prevent IDF stations from having full visibility of all turbines within the forest, is the identified root cause of all five mortalities which occurred within the review period. The issue is compounded by the existence of carbon protected forest in close proximity to turbines, which also prohibits removal of vegetation, for any purpose.	Complies	WCHPL
Vegetation management strategies for each vegetation type will be developed, listing vegetation management actions, needs and monitoring for each WTG's CMZ	At all times during operation	EPN G11 Commitment 98	Implemented via Vegetation Management Guidelines (internal project document). Primarily, the main actions implemented within CMZ relate to removal of scrub vegetation to ensure ground cover visibility, and treatment of weeds within wind farm infrastructure.	Complies	WCHPL
Known locations for <i>Pterostylis pratensis</i> , <i>Prasophyllum crebriflorum</i> , <i>Glycine latrobeana</i> , and <i>Discaria pubescens</i> will be uploaded to the NVA and CHWF GIS to aid in management of these features.	Commencement of operations	Commitment 104, 105, 106, 107, 108	All ecological survey data undertaken by VDC has been uploaded to the NVA and dedicated offsets established to conserve these species.	Complies	WCHPL

Description of Specific Commitment	Timing	Approval Ref	How is Commitment addressed?	Complies?	Responsibility
A 50m exclusion zone will be applied around known <i>Discaria pubescens</i> plants to avoid potential for damage or disturbance due to maintenance or other site activities.	At all times	EPN FF1 Commitment 36	Implemented via CEMP and OEMP provisions and included within Staff and contractor inductions, training, and awareness.	Complies	WCHPL
No access will be permitted to the on-site Flora and Discaria offset areas	At all times	-	Implemented via OEMP and related internal processes, including site and staff induction and awareness training. The Bashan ledge flora offset is also completely fenced off to prevent staff or visitor access.	Complies	WCHPL
A wheel wash will be included within the site O&M compound and all Heavy vehicles will be washed down before entering 'Lake Echo' in accordance with DPIPWE Washdown Guidelines (2004).	At all times	EPBC Cond. 22 EPN G11 Commitment 100	A washdown facility is available at the OM compound, but following completion of construction, heavy vehicle access to the Lake Echo covenant is no longer required, and no vehicle use is permitted outside the internal road infrastructure established for the wind farm.	Complies	WCHPL
A weed treatment program will be implemented in accordance with the approved WMP, in conjunction with regular HSE inspections of previously disturbed areas to monitor for any weed outbreaks	At all times	EPBC Cond. 22 EPN G11	Inspections of previously disturbed areas were ongoing within the review period and have indicated rehabilitation of previously disturbed areas is now substantially complete. All areas of highland poa which were disturbed have completely regenerated, indicating the soil disturbance method proposed in the CHWF rehabilitation plan has proven effective.  A new weed and vegetation management contractor was engaged during the review period to provide ongoing monitoring and control of any weed outbreaks, and records of areas treated in accordance with approved methods as per the WMP.	Complies	WCHPL
Soil and water management will generally be in accordance with the Forest Practices Code 2000 and Waterways and Wetlands Works Manual: EBPGE for works in waterways and wetlands in Tasmania, 2003.	At all times	EPN G11	The OEMP addresses Soil and water management.	Complies	WCHPL
Drains and culverts will be inspected regularly, and a maintenance schedule adopted to ensure all drains have adequate controls and are functioning effectively, including drainage around hardstands.	At all times	EPN G11	Drains are inspected generally in accordance with the maintenance schedule outlined in the OEMP.	Complies	WCHPL
Areas that are designated as needing rehabilitation will be identified as Rehabilitation Management Units' (RMU) to enable rehabilitation to be documented and tracked to monitor success of rehabilitation.	At all times	EPN G11 Commitment 99	A tracking system was established for post-construction rehabilitation.	Complete	WCHPL
Rehabilitation of disturbed areas will focus on re-establishing suitable conditions for recolonization by <i>Pterostylis pratensis</i> ; <i>Prasophyllum crebriflorum</i> ; <i>Glycine latrobeana</i> ; and <i>Discaria pubescens</i> .	At all times	EPN G11 Commitment 102	Rehabilitation practices differ for covenant areas and support natural regeneration.	Complies	WCHPL

Description of Specific Commitment	Timing	Approval Ref	How is Commitment addressed?	Complies?	Responsibility
Rehabilitation activities near disturbed areas of <i>Pterostylis pratensis</i> ; <i>Prasophyllum crebriflorum</i> ; or <i>Glycine latrobeana</i> must be undertaken in a manner compatible with these species.	At all times	EPN G11 Commitment 103	Rehabilitation practices differ for covenant areas and support natural regeneration. Methods for each were established in the rehabilitation management plan developed for construction phase.	Complies	WCHPL
The Pre-Construction Unanticipated Discovery Plan will be implemented as part of the OEMP	At all times	EPN FF6 FF8 FF10 Commitment 49	Unanticipated Discovery provisions are included within the OEMP.	Complies	WCHPL
A 50m exclusion zone will be established to protect existing European and Aboriginal heritage sites for the duration of operations	At all times	EPN G11, LO4 Commitment 44	Implemented via OEMP and related internal processes, including site and staff induction and awareness training.	Complies	WCHPL
The safe storage, transfer, use and disposal of hazardous materials and dangerous goods during wind farm operations will include requirements in s4.9 of the OEMP (based on s 6.7.4 of the DPEMP).	At all times	EPN H1 - H4 Commitment 20	Implemented via OEMP and related internal processes, including site and staff induction and awareness training	Complies	WCHPL
An inventory of all dangerous goods and hazardous substances will be held on site and kept current, showing the location and maximum volume of each substance with SDSs held at points of use.	At all times	EPN H1 - H4	Refer Appendix C to this AER report. Dangerous goods and hazardous substances held or used on site are now minimal following completion of construction of the CHWF.	Complies	WCHPL
All dangerous goods / substances will be stored in impervious bunded areas or self-bunded containers.	At all times	EPN H1 - H4	Dangerous goods / substances stored in impervious bunded areas and minimal volumes required for operations.	Complies	WCHPL
A post commissioning noise survey will be carried out within 3 months of commissioning to verify noise predictions	within 3 months of commissioning	EPN N2 Commitment 16	VIPAC were engaged to carry out the noise monitoring as required – report completed and forwarded to EPA. No noise issues identified.	Complete	WCHPL
Special audible characteristics (SACs) including infrasound will be included in post-commissioning noise monitoring if noise complaints are received	If noise complaints are received	EPN N2 Commitment 17	No noise complaints have been received by site since commencement of operation of the CHWF.	Complies	WCHPL
Noise management during operation will be in accordance with Section 4.10 of the OEMP	During operations	EPN G11, N1 Commitment 14	Noise operations comply with requirement and no complaints have been received.	Complies	WCHPL
An onsite sewerage system will be installed to the satisfaction of Council's Senior Environmental Health Officer in the Substation and/or O&M compound prior to commencement. .	First quarter of operations	EPN G7 G11 Commitment 9	An onsite sewerage system was installed to the satisfaction of CHC at the O&M compound prior to commencement of commissioning	Complete	WCHPL
All waste sewerage will be disposed of by a licenced waste disposal contractor.	Quarterly or as needed	EPN OI11 Commitment 18	Sewerage is disposed of by a licenced waste disposal contractor on an as-needed basis.	Complies	WCHPL
Liquid waste management will be undertaken consistent with Section 4.11 of the OEMP.	At all times	EPN G11, OI1 Commitment 12	Liquid waste management is undertaken in accordance with the provisions outlined in the OEMP.	Complies	WCHPL



Description of Specific Commitment	Timing	Approval Ref	How is Commitment addressed?	Complies?	Responsibility
Management of solid and controlled waste during operations will be consistent with Section 4.11 of the OEMP.	During operations	EPN WM1, OI1 Commitment 18	Solid waste management is undertaken in accordance with OEMP provisions.	Complies	WCHPL
Any over dimensional deliveries to site will be undertaken to the satisfaction of the responsible authority.	If required	Commitment 57	No O/S deliveries were required or undertaken within the review period.	Complies	WCHPL
During operations heavy vehicle movements within the wind farm will be minimised between dusk and dawn.	At all times	EPN G7 Commitment 29	No heavy vehicle movements were required or occurred within the review period, but requirement is in place.	Complies	WCHPL
Management and maintenance of internal access tracks will be included within the OEMP.	At all times	EPN G11 Commitment 52	Management and maintenance of internal tracks is part of the scope of the CHWF service team and is included within the OEMP.	Complies	WCHPL
Dust suppression will be applied on an as needed basis to ensure prevention of environmental nuisance to surrounding residents.	At all times	OEMP	Dust suppression can be undertaken on an as-needed basis but has not been required following completion of construction of the CHWF.	Complies	WCHPL
All vehicles and equipment will be maintained in line with manufacturers recommendation to prevent smoke, odours and fumes.	At all times	OEMP	All WCHPL vehicles are maintained as per manufacturers recommendations. No issues related to smoke, odour, or fumes has occurred throughout wind farm operations to date.	Complies	WCHPL
The ERP will be finalised in consultation with the TFS, SES, and EPA before operations commence.	Prior to operations	EPN G9	The ERP was finalised in consultation with SES, TFS, and EPA and approved prior to operations commencing. Consultation with fire and emergency services agencies occurs every year as part of site emergency planning processes.	Complete	WCHPL
The Fire Response Plan will be amended post-commissioning in consultation with the TFS.	Prior to operations	EPN G9 Commitment 66	FRP developed as part of ERP based on consultation with TFS and approved before commissioning commenced	Complete	WCHPL
As-built locations, maximum heights and elevations (AHD) of all wind turbines installed will be provided to CASA, ASA and the RAAF	Prior to completion of commissioning	Commitment 61	As built locations provided to ASA and CASA as part of Tall Structures reporting	Complete	WCHPL