NRM SOUTH
NATURAL RESOURCE MANAGEMENT

Image: Wedge-tailed eagle nest (Dr Adam Cisterne)

WEDGE-TAILED EAGLE RESEARCH FUND

2025 ANNUAL REPORT

Prepared for Wild Cattle Hill Pty Ltd.

AUGUST 2025

CONTENTS

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, *Aquila audax fleayi*

INTRODUCTION

This is the sixth Annual Report for the Wedge-tailed Eagle (WTE) Research Fund ('The Fund'). It covers the achievements since the last Annual Report in September 2024.

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 23rd August 2019.

It is noted that on 17 December 2024, Atmos Renewables acquired 100% of the interests in the Cattle Hill Wind Farm and is therefore now the official owners of the asset.

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 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.

[1]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.

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.
- 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 (as an observer, Dr Rachael Alderman, Director Threatened Species and Biodiversity).
- 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 Tasmanian wedge-tailed 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 are now in their second term.

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.

NRM South has also now established a Project Governance Steering Committee (PGSC) to oversee externally funded projects. The PGSC serves a crucial function in overseeing projects and providing guidance on best practice project management and governance processes, with recognition of the parameters and processes required by some funding entities. It is responsible for reviewing project progress and providing advice and recommendations on:

- Project performance (e.g. delivery against milestones and budget),
- Project risk (e.g. WHS and compliance) and
- Project management processes (including change, quality and stakeholders)

The Committee is an advisory committee to the NRM South Board (does not have delegated authority) and includes Board representation (through the Committee's Chair). The WTE Research Fund is included in the remit of the PGSC.

ACHIEVEMENTS DURING 2025

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

Details of the achievements:

1. The seventh deposit (including the set-up contribution) to The Fund was received from Wild Cattle Hill Pty Ltd in October 2024.

2. 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) was completed. The final payment was made following approval of the final report. (The findings of this study were presented in the 2024 Annual report).

3. A grant round was advertised in October 2024. Four applications were received, with a total of $274,273.56 being sought, which was significantly higher than that available. The TAC determined that two applications warranted funding, and agreed that allocating part of the 2025 funds as well as 2024 funds would enable both to be supported. The cost of supporting the two projects totalled $136,083, which is $36,083 over the $100,000 allocation for 2024. Hence $36,083 was allocated from the 2025 round. This resulted in a reduced amount available for 2025 and the TAC agreed that these funds would be retained and combined with the 2026 round.

PROJECTS SUPPORTED IN 2024/25

GRANTS AWARDED

1. 2024-25: Characterising the demographic history and evolutionary trajectory of Tasmanian wedge-tailed eagles using whole genomic sequencing (Ahrrens, Miller, Burridge, Weeks). To be completed in November 2025.

Project summary:

Current estimates suggest that the census population size of wedge-tailed eagles in Tasmania is approximately 1000-1500 adults. However, estimates of effective population size (number of reproductive adults; N_e) remain uncertain, but are generally orders of magnitude smaller than census sizes and inherently difficult to quantify using traditional genetic methods. Contemporary estimates of N_e are vitally important for informing conservation, as N_e is the ultimate indicator of overall genetic health and population stability. Rapid historical losses and persistent non-natural deaths are expected to have a measurable impact on N_e by reducing the number of breeding individuals. This can expose affected populations to negative demographic processes that can adversely impact genetic health, population fitness and environmental resilience. Thus, significant reductions in N_e can have long-term consequences for population recovery and persistence.

This project seeks to build on the findings of Stojanovic (2022) to gain a more reliable and robust estimate of contemporary N_e for the TWTE population and understand how N_e and genetic variation changed through time. Our analyses based on whole genome sequencing (WGS) data will determine the impacts of historical and more recent human activities on N_e (i.e., culling practices, landscape modification and wind farm expansion). Outputs from this project are expected to provide a much-needed resource for informing future conservation management of TWTE population by providing reliable estimates of population growth trajectories (positive or negative), and uncovering reasons for differentiation between Tasmania and mainland populations of wedge-tailed eagles.

2. 2024-25: Making the surveys count: an innovative approach to convert relative abundance data to a population estimate for the Tasmanian wedge-tailed eagle, through direct measurement of detectability (Pay, Johnson, Zhang, Hawkins, Potts). To be completed in March 2027.

Project summary:

We will develop an innovative method to estimate Tasmanian wedge-tailed eagle (TWTE) population size from structured annual survey data. Such an estimate is long overdue, and will enable review of its conservation status. An empirical population estimate is necessary, since, even if the trend is stable, strategic conservation decisions will be radically affected by information on whether the population is now close to extinction or is quite large.

Researchers from the University of Tasmania, in collaboration with researchers from the Australian National University and the Bookend Trust, have been pioneering a range of innovative approaches to the population estimate. These integrate multiple novel tools and methods to enhance reliability and accuracy:

1. Territory analysis: using GPS tracking data from adult eagles to estimate how territory size varies across Tasmania and calculate the total number of territories on the island.

2. Genetic techniques: applying advanced genetic methods to determine the effective population size (work previously funded through the WTE Research Fund).

3. Detectability modelling: combining GPS tracking data with human observation records to directly measure detectability for the species and translate survey numbers into a population estimate (this application).

Each offers significant advantages over the previous approaches, but also has inherent limitations. By synthesising these diverse, independent methods, we aim to leverage their complementary strengths and mitigate weaknesses, ultimately producing the most robust and comprehensive population estimate, collect and analyse field data on detectability through standardised surveys near GPS-tagged eagles. With sufficient field data, we anticipate that we will be able to accurately model the proportion of surveys which miss a tagged eagle, against its distance from the observers. This will allow us to estimate the population size by combining the resulting detection function with ongoing WWW survey data.

PHD PROJECT

"How is TWTE habitat selection affected by human activities and land-use intensity?"

The project will be housed in the School of Natural Sciences at Utas, and supervised by:

- Dr James Pay, University of Tasmania (Supervisor)
- Professor Chris Johnson, University of Tasmania (Supervisor)
- Associate Professor Chris Burridge, University of Tasmania (Supervisor)
- Dr Catherine Young, NRM South (Advisor) – to ensure the project remains focussed on the WTE Research Fund objectives.

The funding covers a 3.5 year stipend, plus top up bursary, mandatory paid leave, relocation allowance and fieldwork costs.

This project will commence in October 2025. A student been selected and signed on. The scholarship will be paid in 4 stages, commencing upon the enrolment of the student.

Brief project outline

This PhD project will investigate how TWTEs respond to a range of human activities. The project will have a particular focus on using existing datasets (including GPS-tracking data from 41 adult and 25 pre-adult TWTEs) as well as carrying out field experiments to assess effects of disturbance on behaviour and breeding success of eagles.

The project will aim for a broad understanding of the ways in which eagles respond to human activities and

a variety of land uses. In doing so it will answer several questions relating to specific disturbances that are most likely to be influential. The list of questions the project could address includes:

1. How is TWTE habitat selection affected by human activities and land-use intensity? Including:

    - How does operation of helicopters affect the behaviour of TWTEs?

    - How is the behaviour of TWTEs, including time spent at the nest during breeding, affected by vehicle traffic?

2. What is the relationship between nest attendance, revealed by GPS tracking, and nest success?

A summary of the context for each question, along with potential strategies for addressing them, is included below. Outputs from each of these project components can be synthesised using a vulnerability analysis to discover what levels of disturbance could be sufficient to cause population-level effects.

Summary of proposed project components

LITERATURE REVIEW: What are the current methods available for monitoring wildlife disturbance?

During the first year of the PhD program, the candidate will conduct a comprehensive review of the contemporary literature on monitoring wildlife disturbance. This review will encompass an exploration of the latest technologies currently at our disposal and update information provided in previous reviews on the topic (e.g., Cox et al., 2012; Cutler and Swann, 1999; Preisler et al., 2006). Conclusions from this review may offer innovative ideas and strategies for subsequent inclusion in the data chapters of the PhD thesis.

1. How is TWTE habitat selection affected by human activities?

Human activities can change the way animals use the landscape. For example, at a fine-scale animals can avoid anthropogenic activities (Barker et al., 2023; Suraci et al., 2019), or at a broadscale anthropogenic activities could increase or reduce the size of the area used by individuals (Perona et al., 2019). Understanding these dynamics has relevance to conservation management. The increasing temporal resolution of modern GPS-tracking technologies, together with advances in statistical techniques, are facilitating a more detailed understanding of animal behaviour alongside habitat use. By incorporating spatial information on human activities, modern habitat selection modelling methods can provide insight into how human activities affect wildlife movement. The project can incorporate the GPS data collected from TWTEs into models that assess how particular sources of human disturbance (for which spatial data are available, e.g., roads, land use change, fuel reduction burns) affect the spatial ecology of TWTEs.

    - How does operation of helicopters affect the behaviour of TWTEs?

Aerial nest surveys are carried out by a number of industries in Tasmania, both to search areas for TWTE nests and to check if TWTE nests are being used in any given breeding season. Furthermore, helicopter traffic associated with various other purposes is also commonplace across the state (e.g., fire management, tourism, construction work, infrastructure surveys). There is little information on how the behaviour of TWTEs is affected by these aircraft. Helicopter flight path data are recorded by industries, which includes information on the time, location, altitude, and speed of the aircraft. These data include flights that have been carried out across territories where adult eagles were being GPS-tracked over the last four years. By combining these existing datasets, the project can investigate this question by assessing if and how eagle flight behaviour and nest attendance is affected by helicopter flights, and how any affects are linked to the flight path characteristics of the aircraft (e.g., speed, altitude, direction).

    - How is the behaviour of TWTEs, including time spent at the nest during breeding, affected by vehicle traffic?

A large number of TWTE nests are situated within 1 km of roads or vehicle tracks. Current guidelines, adapted from forestry practices (limiting activities within 500 m - 1 km line-of-sight), are employed to mitigate potential impacts from road-based vehicle use during the breeding season. However, there

is a lack of information regarding how TWTEs respond to vehicle traffic at the distances of current recommendations. Consequently, it is uncertain whether these guidelines need adjustment, either to enhance conservation or to reduce industry costs. The project can use traffic counters to assess how the frequency and type of vehicle movements affects the behaviour of breeding GPS-tracked TWTEs (e.g., time spent at the nest). This could also include an experimental component, whereby vehicle movements are introduced at sites where breeding TWTEs are being monitored.

2. What is the relationship between nest attendance, revealed by GPS tracking, and nest success?

GPS-tracking can be used to provide valuable information on the breeding behaviour of birds (Murgatroyd et al., 2023; Schreven et al., 2021). However, it is essential to align GPS-derived movement data, such as nest visit durations, with on-site nest surveys for validation. This validation ensures that conclusions drawn from GPS data regarding breeding season timing and nest outcomes are substantiated. By comparing survey data with GPS data from breeding TWTEs, the project can obtain information on how movement characteristics relate to observed breeding events. This will provide an assessment of the utility and limitations of movement data for monitoring TWTE breeding behaviour. Results will contribute to existing work on the TWTE aiming to use GPS-data to inform population models and assess the impacts of disturbance during breeding.

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NEXT STAGE IN THE FUND

The next round of grants will be advertised in 2026 and will include that year's allocation plus the residual funds from 2025.

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.

2021:
- Estimating the population size of the Tasmanian wedge-tailed eagle (Aquila audax fleayi) using modern genetic techniques.
- Monitoring wedge-tailed eagle population trends.

2022:
- Investigation the spatial ecology and habitat use of Tasmania wedge-tail eagles in the Tasmanian Midlands using high-frequency GPS telemetry.

2023:
- Comprehensive analysis of the ecotoxin threat to Tasmanian Wedge-Tail Eagles.

PROJECTS AWARDED SUPPORT BY THE FUND: UNDERWAY

2024-25:
- Characterising the demographic history and evolutionary trajectory of Tasmanian wedge-tailed eagles using whole genomic sequencing (Ahrrens, Miller, Burridge, Weeks). To be completed in November 2025.
- Making the surveys count: an innovative approach to convert relative abundance data to a population estimate for the Tasmanian wedge-tailed eagle, through direct measurement of detectability (Pay, Johnson, Zhang, Hawkins, Potts). To be completed in March 2027.

PROJECTS AWARDED SUPPORT BY THE FUND: TO COMMENCE

PhD project: How is TWTE habitat selection affected by human activities and land-use intensity? To commence in October 2025.