

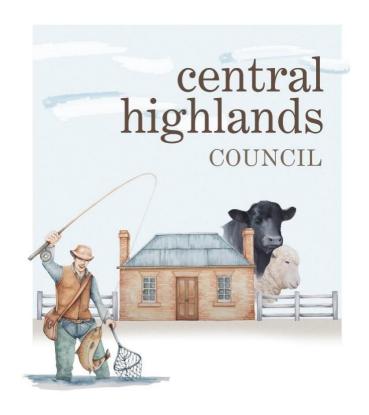
Agenda Attachments

23 September 2025

Ordinary Council Meeting
Hamilton Council Chambers

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Council Meeting Minutes

19th August 2025
Bothwell Council
Chambers

Notice of Meeting of Council - Tuesday 19th August 2025

To Councillors,

In accordance with the Local Government (Meeting Procedures) Regulations 2015, Notice is hereby given, that an Ordinary Meeting of Central Highlands Council is scheduled to be held in the Council Chamber, **Bothwell** on **Tuesday 19th August 2025**, commencing at **9.00am** with the business of the meeting to be in accordance with the following agenda paper.

In accordance with the Local Government (Meeting Procedures) Regulations 2015 Part 2, Division 1, a notice of the meeting was published on the Council website on 1 August 2024.

General Manager's Certification

PURSUANT to Section 65 (1) of the Local Government Act 1993, I hereby certify, with respect to the advice, information and/or recommendation provided for the guidance of Council in this Agenda, that:

- A. such advice, information and/or recommendation has been given by a person who has the qualifications or experience necessary to give such advice; and
- B. where any advice is given by a person who does not have the required qualifications or experience, that person has obtained and taken into account the advice from an appropriately qualified or experienced person.

Section 65(2) forbids Council from deciding any matter which requires the advice of a qualified person without considering that advice.

Dated at Hamilton this 14th day of August 2025.

Stephen Mackey

Acting General Manager

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The meeting commenced at 9.00 a.m.

AUDIO RECORDING DISCLAIMER

As per Regulation 33 (2) (a) of the Local Government (Meeting Procedures) Regulations 2015, audio recordings of meetings will be made available to Councillors, staff and members of the wider community including Government Agencies at no charge and will be made available on Council's website as soon as practicable after each Council Meeting. Unlike Parliament, Council meetings are not subject to parliamentary privilege, and both Council and the individual may be liable for comments that may be regarded as offensive, derogatory and/or defamatory.

The Mayor advises the meeting and members of the public that Council Meetings, not including Closed Sessions, are audio recorded and published on Council's Website in accordance with Council's Policy 2017-50.

The Mayor also advises, that members of the public are not permitted to make audio recordings of Council Meetings without prior approval being granted.

ACKNOWLEDGEMENT OF COUNTRY

I acknowledge and pay respect to the Tasmanian Aboriginal Community as the traditional and original owners and continuing custodians of this land on which we gather today and acknowledge and pay respect to Elders, past, present and emerging.

CONDUCT OF COUNCIL MEETING

Central Highlands Council takes safety seriously. We have a duty to ensure that we provide a safe workplace for our Employees, Councillors, Contractors and members of the public while present at Council's workplaces.

These premises form part of the Council's workplace, and it is expected that everyone who attends Council meetings will behave in a polite and respectful manner. People should refrain from using offensive or derogatory language or comments and not be aggressive, threatening or speak in a hostile manner.

1. PRESENT

Mayor L Triffitt; Deputy Mayor J Allwright; Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller

1.1 IN ATTENDANCE

Mr Stephen Mackey (Acting General Manager), Zeeshan Tauqeer (Accountant), Kat Cullen (Community Relations Officer), and Mrs Katrina Brazendale (Minute Secretary).

1.2 APOLOGIES

Nil

2. CONSIDERATION OF SUPPLEMENTARY ITEMS TO THE AGENDA

Nil.

3. DECLARATION OF PECUNIARY INTEREST AND CONFLICT OF INTEREST BY COUNCILLORS AND STAFF

PURPOSE

In accordance with the requirements of Part 2 Regulation 8 of the Local Government (Meeting Procedures) Regulations 2015, the chairperson of a meeting is to request Councillors to indicate whether they have, or are likely to have, a pecuniary interest or conflict of interest in any item on the Agenda.

Cr J Honner – Item 16.1 Development & Environmental Services Report Katrina Brazendale – Item 12.3 Community Donation Request – Bothwell School Careers Expo

4. MINUTES

4.1 CONFIRMATION OF DRAFT ORDINARY COUNCIL MEETING MINUTES – 15 JULY 2025

RESOLUTION 01/08.2025/C

Moved: Cr J Honner Seconded: Cr J Hall

THAT the Draft Minutes of the Ordinary Meeting of Council held on Tuesday 15 July 2025 be confirmed.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

Attachment – Draft Minutes

PURPOSE

The purpose of the report is to confirm the Council Minutes of the previous month. Copies of the minutes have been previously circulated to Councillors prior to the meeting.

5. NOTIFICATION OF COUNCIL WORKSHOP(S) HELD

Nil

5.1 FUTURE WORKSHOP(S)

PURPOSE

The purpose of the report is for Councillors to note the Council Workshop date(s).

The proposed next Council Workshop will be held on the following date(s).

Tuesday 26th August 2025 – 9.30am Bothwell

6. PUBLIC QUESTION TIME

In accordance with the *Local Government (Meeting Procedures) Regulations 2015*, the Council conducts a Public Question Time Forum to enable members of the public to ask question on Council related matters.

A period of 15 minutes, if required, will be set aside at the beginning of each Ordinary Council Meeting to conduct Public Question Time. If a response to a question cannot be provided at the meeting a written response will be provided as soon as practicable.

A member of the public may give written notice to the General Manager, 7 days before a meeting of a question to be put to the Meeting.

The Chairman may invite any member of the public present at a meeting to ask questions, without notice, relating to activities of the Council, subject to the provisions of Clause 2 below.

- 1. Once Question Time commences the Chairman will determine the order in which questions are heard.
- 2. Questions may relate to any business of the Council capable of being discussed in the open portion of the meeting, and which is not listed as an item for consideration on the Agenda for the Council Meeting.
- 3. Members of the public proposing a question are required to be present at the Council Meeting at which their question is to be read. Where a person submits a question for Public Question Time but fails to attend the meeting, the question will be treated as general correspondence and a written response will be provided at the earliest opportunity.
- 4. A person asking a question, when called upon by the Chairman is requested to:
 - Stand.
 - State their name and address,
 - Read out their question.
- 5. The Chairman retains the right to accept or decline questions and to determine if the question is to be answered at the meeting by the appropriate Councillor or employee or written down and taken on notice. The decision to take the question on notice may also be taken by the Councillor or employee to whom the question is directed. Questions taken on notice will be answered at a later meeting.
- 6. The Chairman may rule a question inappropriate, and thus inadmissible if in his or her opinion it has already been asked, is unclear, irrelevant, insulting, improper or relates to any matter which would normally be discussed in the closed portion of the meeting as defined in the *Local Government (Meeting Procedures) Regulations 2015*.
- 7. Public Question Time forum will be limited to a maximum of 15 minutes in duration and will be declared closed following the expiration of the allocated time period, or where all valid questions have been dealt with, whichever is the sooner.
- 8. Each question is to be asked by the proponent who will be allowed a maximum of three minutes in which to put the question.
- 9. The Chairman will **not allow** any discussion or debate on either the question or the response.
- 10. Where a person proposes more than one question at any one forum, and there are a number of persons wishing to lodge questions, the Chairman may take the questions in such order so as to hear as many members of the public as practical during the time allocated.
- 11. The minutes of the Council Meeting will contain a summary of each question asked by members of the public and the response given.
- 12. Public Statements (as opposed to questions) <u>will not</u> be accepted for the reason that statements could be considered a form of participation.

Pertaining to any Planning Authority agenda item within this agenda, Council will do so in accordance with Council's Policy 2017-49.

Both the Public Question Time Procedure above and Council's Policy 2017-49 'Public Comment on Planning Agenda Items' will be available for the public to view at the meeting.

The following members were in the gallery:

Damian Bester and Stephen Loring

Stephen Loring raised the following question – Shannon Bridge Miena has there been any correspondence received in reply to Council letters.

7. PETITIONS / DEPUTATIONS / PRESENTATIONS

7.1 PETITIONS

Nil

7.2 DEPUTATIONS

Eve Lazarus (Derwent Catchment) - Drought Ready Fund Grant

Don Thompson and Bree Hunter (Hydro Tasmania) - Tarraleah Redevelopment Project

7.3 PRESENTATIONS

Nil

8. NOTICE OF MOTIONS

PURPOSE

Under Regulation 16 of the Local Government (Meeting Procedures) Regulations 2015 relating to Motions on Notice. It states the following:

(5) A Councillor may give to the general manager, at least 7 days before a meeting, give written notice of a motion, together with supporting information and reasons, to be included on the agenda of that meeting.

8.1 NOTICE OF MOTION - CR D MEACHEAM

RESOLUTION 02/08.2025/C

Moved: Cr D Meacheam **Seconded**: Cr R Cassidy

THAT Council adopt AS/NZS 4282:2023, Control of the obtrusive effects of outdoor lighting.

LOST 2/6

For the Motion

Cr D Meacheam and Cr Y Miller.

Against the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall and Cr J Honner

NOTICE OF MOTION

Date of Meeting:	August 19, 2025
Councillor Name:	David Meacheam
Proposed Motion:	That Council adopt AS/NZS 4282:2023, Control of the obtrusive
	effects of outdoor lighting.
Background Details:	There is increasing interest in dark sky tourism within Tasmania. This
	relates not only to observing the stars and moon, but also to
	maintaining the best possible views of the southern Aurora.
	Dark skies tourism is one of the mainstays of the economies of some
	other municipalities within Australia, notably Warrumbungle Shire
	Council in NSW.
	AS/NZS 4282:2023 sets out requirements for the control of the
	obtrusive effects of outdoor lighting. It includes limits for the
	relevant light technical parameters to control these effects.
	If adopted, this policy would relate to newly built residential and commercial premises and renovations to existing premises. Within
	the context of a new build, conforming to these external lighting
	standards should not impose additional, unreasonable costs upon
	builders. Adoption of this motion would not preclude Installation of
	motion detector security lighting. If not already compliant, Council
	might consider replacing street lighting with fixtures that comply
	with the AS/NZS standard.
	A natural complementary element would be for the visitor centre to
	maintain directions towards sites within the municipality where the
	aurora might be best observed.
	and the state of t
Signature:	David Meacheam
U	200000000000000000000000000000000000000
Date:	1/8/25

8.2 NOTICE OF MOTION - CR D MEACHEAM

RESOLUTION 03/08.2025/C

Moved: Cr D Meacheam **Seconded**: Cr Y Miller

THAT the present system of the Mayor deciding the seating order of Councillors be discontinued.

LOST 3/5

For the Motion

Cr A Archer; Cr D Meacheam and Cr Y Miller.

Against the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr R Cassidy, Cr J Hall and Cr J Honner;

NOTICE OF MOTION

Date of Meeting:	August 19, 2025.
Councillor Name:	David Meacheam
Proposed Motion:	That the present system of the Mayor deciding the seating order of
	Councillors be discontinued.
Background Details:	There is no justification within the Local Government Act, or the
	Meeting Procedures Act, or Council policy, for the Mayor to direct
	the seating order of Councillors.
	Having the Deputy Mayor and General Manager seated adjacent to
	the Mayor makes sense in terms of the orderly conduct of meetings.
	The present system of seating of other councillors, unilaterally decided by the Mayor, is contrary to our productivity. If one or more Councillors are working on a motion, or a policy or strategy initiative, it would make sense for them to be sitting together in order for them to more effectively advance their case.
	If adopted, this motion should apply to not only formal meetings of Council, but also to Council workshops.
Signature:	David Meacheam
Date:	1/8/25

8.3 NOTICE OF MOTION – CR Y MILLER

RESOLUTION 04/08.2025/C

Due to Cr Y Miller needing to declare an interest in this motion and being unable to move her notice of motion. This is being withdrawn subject to a motion for the next meeting.

Moved: Cr Seconded: Cr

THAT the Council waive the development application fees on behalf of the Lions club and CWA both of Bothwell.

NOTICE OF MOTION

Date of Meeting:	August 19, 2025
Councillor Name:	Yvonne Miller
Proposed Motion:	That the council waive the development application fees on behalf of the Lions club and CWA both of Bothwell.
Background Details:	There was a shed on the property used by the Bothwell Lions and CWA. During a recent storm the said shed was extensively damaged and repaired to some extent. The contents within the shed have been water damaged and the shed is still under threat of falling apart. Currently the shed is being used for overflow goods namely marquees, furniture, crockery and donations for our trade table. A large amount of clothing donations have been disposed of which got damp and mildewy. The installation of a container which would be shared by both the Lions Club and CWA would be weatherproof and secure. The container would not be in view of the road as it would be behind the current building.
Signature:	Yvonne Miller
Date:	4/8/2025

8.4 NOTICE OF MOTION – CR Y MILLER

RESOLUTION 05/08.2025/C

Moved: Cr Y Miller **Seconded**: Cr A Archer

THAT the acknowledgement to country be used only for major events such as Australia Day.

LOST 3/5

For the Motion

Deputy Mayor J Allwright, Cr A Archer and Cr Y Miller.

Against the Motion

Mayor L Triffitt, Cr R Cassidy; Cr J Hall; Cr D Meacheam and Cr J Honner

NOTICE OF MOTION

Date of Meeting:	August 19, 2025
Councillor Name:	Yvonne Miller
Proposed Motion:	That the Acknowledgement to country be used only for major events such as Australia Day.
Background Details:	The use of the Acknowledgment to country being read every month at the council meetings first came into use in the 1970s making its way into the community in the 1990s with the then PM Paul Keating and his reconciliation bills. At first it was recited at major events. Now it is being overused making it meaningless. It is now being seen as divisive to the extent that some high profile indigenous leaders are arguing against it's use.
Signature:	Yvonne Miller
Date:	4/8/2025

9. COUNCIL ACTING AS A PLANNING AUTHORITY PURSUANT TO THE LAND USE PLANNING AND APPROVALS ACT 1993 AND COUNCIL'S STATUTORY LAND USE PLANNING SCHEME

Nil

10. ORDINARY COUNCIL MEETING RESUMED

Nil

11. MONTHLY MAYORAL AND ELECTED MEMBERS ACTIVITY

RESOLUTION 06/08.2025/C

<u>Moved</u>: Cr J Hall <u>Seconded</u>: Cr J Honner

THAT the Council notes the Mayoral and Elected Members Activities.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

IMPLICATIONS AND FINANCIALS

Strategic Plan	6.2 Ensure that Council members have the resources and skills development opportunities to effectively fulfil their responsibilities
Council Policy	Councillor Code of Conduct Policy
Legislative Context	Local Government Act 1993 Local Government (General) Regulations 2015 Local Government (Model Code of Conduct) Order 2024
Consultation	The community and stakeholders.
Impact on Budget/Resources	Not applicable.
Risk	Allocations for Councillor Conference attendance are included in the operational budget.

PURPOSE

This report aims to provide an overview of the Mayor and Elected Member's monthly activities.

BACKGROUND

The Mayor and Elected members can provide an activity report each month summarising any civic events they attend.

DISCUSSION

The Mayor and Elected Members represent the council at public and civic events and are the political interface between other bodies, governments, and the Council. In accordance with the Local

Government Act 1993, the Mayor is designated as the spokesperson for the Council as well as a

representative for the Council on regional organisations and at intergovernmental forums at regional, state, and federal levels. Reports below are provided outside the general functions of a Councillor, whereby Councillors meet with ratepayers and attend workshops.

Mayor Loueen Triffitt

10 July 2025 Tasmanian Electoral Commission

14 July 2025 ABC Interview

15 July 2025 Ordinary Council Meeting (Hamilton)

24/25 July 2025 LGAT Annual Meeting

31 July 2025 Tasmanian Electoral Commission 12 August 2025 Meeting and BBQ Ash Cottage

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- Ratepayer and community members communications 6
- Elected Members communications 21
- Council Management communications 7

Deputy Mayor J Allwright

15 July 2025 Ordinary Council Meeting (Hamilton)

Cr A Archer

15 July 2025 Ordinary Council Meeting (Hamilton)

Cr R Cassidy

12 August 2025 Meeting and BBQ Ash Cottage 15 July 2025 Ordinary Council Meeting (Hamilton)

Cr J Hall

15 July 2025 Ordinary Council Meeting (Hamilton)
30 July 2025 Bush Watch Meeting (Hamilton)
5 Average 2025

5 August 2025 Clyde Mill - Whiskey Opening (Bothwell)

Cr J Honner

15 July 2025 Ordinary Council Meeting (Hamilton)

Cr D Meacheam

15 July 2025 Ordinary Council Meeting (Hamilton)

Cr Y Miller

6 August 2025 HATCH Meeting 12 August 2025 Meeting with Louisa

12 August 2025 Meeting and BBQ Ash Cottage

11.1 MAYORAL ANNOUNCEMENT(S)

The Mayor provided two letter that she wanted to share with Council.

1) Letter - Bothwell Sheep Station Cup Community Project Contribution for Bothwell.

Dear Central Highland Council Members,

I am writing in regard to the Bothwell Sheep Stations Cup interest in helping fund a community project in Bothwell.

The Sheep Station Cup has managed to save over \$100,000 in 8 years of running along with our annual contributions to community groups and other charities. As a committee we have discussed where this money would best be utilised and our preference would be to help fund a community gym situated in the Bothwell Recreation Grounds. A community gym would have huge benefits within the community and would be used by a diverse group of people including the football and cricket clubs, exercise groups, people doing rehabilitation from injuries and personal training.

Along with our funding there would potentially be additional available funding from the Cattle Hill Windfarm, Elders Community Fund and Ark Energy Community Fund.

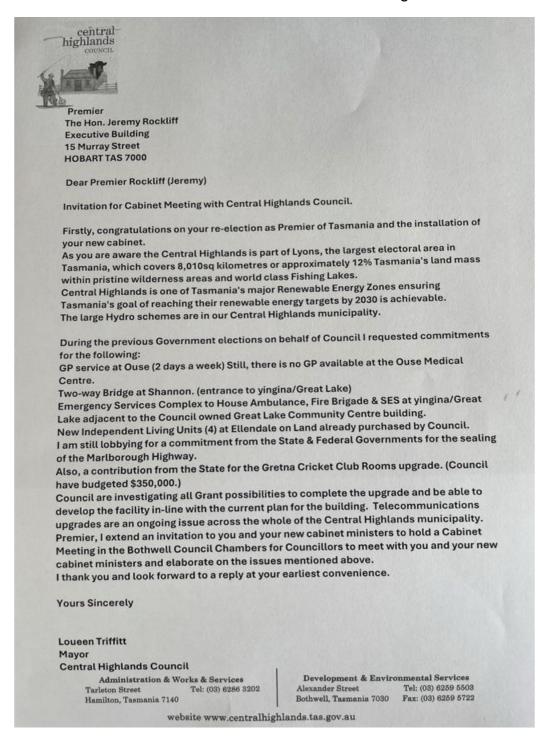
As stated, our preference would be to support a community gym but we are open to any suitable projects the Central Highlands Council is considering.

Yours Sincerely,

Guy Ellis

Bothwell Sheep Station Cup President

2) Letter – Invitation to the Premier to hold a Cabinet Meeting with Council



The meeting was suspended at 10.00am. for a short break and will resume at 10.15am.

The meeting resumed at 10.15 am. Eve Lazarus, Don Thompson and Bree Hunter were in attendance when the meeting resumed.

RESOLUTION 07/08.2025/C

<u>Moved</u>: Cr R Cassidy <u>Seconded</u>: Cr J Honner

THAT Council move to Item 7.2.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

Eve Lazarus from Derwent Catchment provided Council with an update on the recent funding received from the Drought Ready Fund Grant. Eve Lazarus left the meeting at 11.03 am.

Don Thompson and Bree Hunter from Hydro Tasmania provided Council with an update on the Tarraleah Redevelopment Project. Don Thompson and Bree Hunter left the meeting at 11.03 am.

RESOLUTION 08/08.2025/C

<u>Moved</u>: Cr R Cassidy <u>Seconded</u>: Cr J Hall

THAT Council move back to Item 12. on the agenda

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

12. OPERATIONAL MATTERS ARISING (STRATEGIC THEME – COMMUNITY WELL-BEING)

Build capacity to enhance community spirit and sense of wellbeing

- 1.1 Continue to upgrade existing public open spaces and sporting facilities and encourage community use
- 1.2 Advocate for improved health, education, transport and other government and nongovernment services within the Central Highlands
- 1.3 Continue to strengthen partnerships will all tiers of government
- 1.4 Support and encourage social and community events within the Central Highlands
- 1.5 Provide support to community organisations and groups
- 1.6 Foster and develop an inclusive and engaged community with a strong sense of ownership of its area
- 1.7 Foster and support youth activities in the Central Highlands

12.1 HEALTH AND WELLBEING PLAN 2020-2025 - MONTHLY PROGRESS REPORT

RESOLUTION 09/08.2025/C

Moved: Cr J Honner Seconded: Cr Y Miller

THAT the Health and Wellbeing report be received.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

REPORT BY Kat Cullen, Community Development Officer

BACKGROUND

The following activities were performed during July 2025.

COUNCIL PROJECTS AND ACIVITIES		
	Commencement of Disaster Ready Fund (DPAC) Clyde River Flood Resilience partnership with Derwent Catchment Project.	
External Grants	Awaiting response: Tas Active Infrastructure Grants (DPAC) Gretna Oval application. Response expected late August.	

	T
	Awaiting response; Tas Drought Ready Fund – application for funding childcare solutions Options Paper for Bothwell. Response expected late August
	Regional Precinct Partnership Grant Application (RPPP) input.
	Tasmanian Community Fund – meeting with grant coordinator to discuss upcoming rounds. Focus for both Strategic (<\$1.5M over 7 years) and Community Action grants (\$5-50K over 1 year) is providing funding for projects which promote engagement of children 8-19 in learning and educational opportunities.
Cattle Hill Community Grant Fund	Liaising with grant coordinator for Grant Round 5, as Council rep. Support for Cattle Hill Wind Farm Grants community applications for Westerway Hall; Hamilton Showground; Kids and Teens in the Valley School Holiday programs; Ellendale Hall; Steppes Hall and Share the Dignity project developed by Cr Meacheam
Council website upgrade	Initial meetings have been held with designers, awaiting quotes to discuss with General Manager.
Community Grants Program	Administration regarding community grant request Playgroup Bothwell, Miena Seisun, Bothwell Golf Club, Westerway Hall, Campdraft Tas, Reptile Rescue, and sports representation grants.
Rates remissions	Administration for community Rate Relief requests.
School breakfast program support	Liaising with local schools around disbursement of approved school breakfast program funding.
Child Safety Policy update	Working with Deputy General Manager and LGAT to review Child Safety Standards compliance and update relevant policies. Child and Youth Safe Standards seminar - Office of Independent Regulator – Child and Youth Safe Action Plan Workbook
Social Media Policy update	Working with Deputy General Manager on new Social Media policy.
Tourism Industry Council Tas awards &conference	Attendance at awards and conference in Launceston. Bothwell finalist in the Tiny Tourism Town Award for populations under 1,500, which was won by Stanley this year.
ANZAC Day 2026	Forward planning for ANZAC day 2026.
COMMUNITY DEVE	LOPMENT
Childcare	Meetings with Bothwell Community to progress Childcare futures

	Upcoming meeting with Hon. Rebecca White Rebecca regarding childcare in Bothwell Friday 12 September.
	Development of online survey regarding childcare in Bothwell - www.surveymonkey.com/r/75QSXPM.
	Discussions with Childcare Providers and DECYP regarding models of care which could be adopted in Bothwell.
RACT driver	RACT learner driver training, funded to Council through Cattle Hill Wind Farm Grant round 2, continues to be delivered to community.
training	Final round to be delivered in Bothwell August and December.
School holiday programs	Meetings with Kids and Teens in the Valley to look at partnering to deliver 12 months of school holiday programs in Ouse, Hamilton, Gretna, Ellendale and Bothwell, to potentially be funded through Cattle Hill Wind Farm Grant.
	Support and promotion of School Holiday programs at Ouse Online Access Centre and Westerway Hall.
Additional meetings and external communication	Local Government Health & Wellbeing Network regular meeting. Meeting with coordinator Active Tasmania – Dept of State Growth. Ouse Table tennis heating works request for Ouse Hall. Ellendale hall support – upgrades funded through grants. Information provision for political candidates regarding Central Highlands community information and needs.
South Central Workforce	Communications and support for pop up event at Hamiton Hall. RSA training for communities
COMMUNICATION	
Tourism brochure	Update, edit, and reprint for Tourism Brochure exchange
Residents guide	Finalisation of community information and layout for printing.
Council social media	Facebook account– 01-31 July net increase 18. Audience: 2,734. Posts: SWN jobs event, Bushfest, Childcare survey, Dog registration, Ash Cottage Sausage Sizzle.
Market Place Noticeboard	Working to update tourism contents of noticeboard opposite Visitors Centre, Bothwell.
Highland Digest	Liaising with Digest to include relevant council and community content monthly.
Community update email	Quarterly email update to local community organisations around opportunities such as grants and events.

12.2 COMMUNITY GRANT REQUEST – WESTERWAY COMMUNITY HALL UPGRADES

<u>Moved</u>: Cr J Honner <u>Seconded</u>: Deputy Mayor J Allwright

THAT Council allocate \$2,000 to Westerway Community Hall Association for costs associated with installation of an entrance shelter at the hall.

AMENDMENT TO THE MOTION

Moved: Cr R Cassidy Seconded:

THAT Council allocate \$1,000 to Westerway Community Hall Association for costs associated with installation of an entrance shelter at the hall.

THE MOTION LOST DUE TO THE LACK OF A SECONDER

THE ORIGINAL MOTION WAS PUT

RESOLUTION 10/08.2025/C

<u>Moved</u>: Cr J Honner <u>Seconded</u>: Deputy Mayor J Allwright

THAT Council allocate \$2,000 to Westerway Community Hall Association for costs associated with installation of an entrance shelter at the hall.

LOST 4/4

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright,; Cr J Hall and Cr J Honner;.

Against the Motion

Cr A Archer; Cr R Cassidy, Cr D Meacheam and Cr Y Miller

Attachment - Redacted grant application

REPORT BY Kat Cullen, Community Development Officer

BACKGROUND

Council have received a grant application for Westerway Community Hall upgrades. The Hall is central to the social fabric of the local community. Recent events include school holiday programs, film evenings, flood recovery sessions, community gatherings and BBQs, and annually hosts the Westerway/Fentonbury Community ANZAC Breakfasts.

In 2024, Council contributed \$1,500 towards a \$11,352 project to remove and replace damaged, weathered and out-dated cladding on the Westerway Hall. The next stage of this project will replace the shelter over the roadside door to provide weather protection to the entry and shelter while entering the Hall or waiting for school and community buses. The shelter will have a colorbond roof, be open on each end and involves two panel modwood and steel panel screens, the same as on the public toilet.

The total project cost is \$7,747 with other funding including: Hall Committee reserves, in-kind contributions; and a Derwent Valley Council community grant (this grant is anticipated). There is currently \$13,000 remaining in the Community Grants budget for 25-26 financial year.



Westerway Hall showing entrance where new shelter to be installed.

Katrina Brazendale (Executive Assistant) declared an interest and left the meeting at 11.08 am.

12.3 COMMUNITY DONATION REQUEST - BOTHWELL SCHOOL CAREERS EXPO

RESOLUTION 11/08.2025/C

<u>Moved</u>: Cr J Honner <u>Seconded</u>: Cr R Cassidy

THAT Council allocate \$500 to the Bothwell District High School for costs associated with their upcoming Careers Expo to be held at the school.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

REPORT BY Kat Cullen, Community Development Officer

BACKGROUND

Council have received a request for support from Bothwell School for an upcoming Careers Expo on 28 August at the school. The expo will provide careers information for Bothwell, and students from surrounding region who will also be attending. The school has indicated that they are happy to acknowledge Council via their promotions for event.

The school have requested \$500 contribution towards catering. Additional funding for the event has been contributed through school funds and external donations. There is currently \$5,000 remaining for allocation within the Youth Service & Activities project area of the Community and Economic Development Budget.

Katrina Brazendale (Executive Assistant) returned to the meeting at 11.09 am.

12.4 YOUTH ACTIVITY SUPPORT – FOOTBALL TASMANIA SCHOOL HOLIDAY ACTIVITY

<u>Moved</u>: Cr R Cassidy <u>Seconded</u>: Cr Y Miller

THAT Council allocate \$800 to fund a school holiday program at Bothwell with Football Tasmania.

RESOLUTION 12/08.2025/C

AMENDMENT TO THE MOTION

Moved: Cr D Meacheam Seconded: Cr A Archer

THAT Council allocate up to \$1,200 to fund local children for the school holiday program at Bothwell with Football Tasmania

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

THE AMENDMENT BECAME THE MOTION AND WAS PUT AND CARRIED

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

REPORT BY Kat Cullen, Community Development Officer

BACKGROUND

Children and young people of the Central Highlands have extremely low opportunities to engage in school holiday programs within their local area.

Council have received a proposal to run a school holiday program from Football Tasmania. The program would be run by accredited coaches, with all skill welcome for children aged 12 -18.

The nominal cost for this clinic is \$40 per child, which in general would be unaffordable for most Central Highlands families. This has been discussed with Bothwell High School, who have indicated they feel the activity would be well supported, but that the price would be too high for locals. The current Community and Economic Development Budget has \$5,000 allocation for Youth Service & Activities. It is proposed that Council partners with Football Tasmania to offer up to 20 places fee-free, in order to provide this opportunity to local children of the Central Highlands.

13. OPERATIONAL MATTERS ARISING (STRATEGIC THEME – INFRASTRUCTURE AND FACILITIES

Manage Council's physical assets in an efficient and effective manner

- 2.1 Develop and implement a 10 year Asset Management Plan for all classes of assets
- 2.2 Continue to lobby at regional and state levels to improve transport and infrastructure
- 2.3 Seek external funding to assist with upgrading of existing infrastructure and funding of new infrastructure and facilities
- 2.4 Ensure that the standard of existing assets and services are maintained in a cost effective manner

Cr A Archer left the meeting at 11.19 am. and returned at 11.23 am.

13.1 WORKS & SERVICES MONTHLY REPORT – JULY 2025

RESOLUTION 13/08.2025/C

<u>Moved:</u> Cr J Honner <u>Seconded:</u> Cr R Cassidy

THAT the Works & Services monthly report for July 2025 be received.

REPORT BY Jason Branch, Works & Services Manager

BACKGROUND

The following activities were performed during **July 2025** by Works & Services –

Grading & Sheeting	Waddamana Road, Wihareja Road, Penstock Road, Morass Bay Roads, Bluff Road,
Maintenance Grading	Meadsfield Road, Mark Tree Road, Thousand Acre Lane, Woolpack Road, Clarendon Road, Church Road Gretna, Meadowbank Road, Belchers Road, Richardson Road, Dawson Road, Tor Hill Road, Jean Banks Road
Potholing / shouldering	14 Mile Road, Dawson Road, Dennistoun Road, Interlaken Road, Tunbridge Road. Todds Corner, Jones Road, Flemming Drive, Theissen Crescent
Spraying:	
Culverts / Drainage:	Clean culverts Interlaken Road Repair culvert Dennistoun Road Extend culvert Hollow Tree Road Clean culverts Strickland Road Clean culverts Bashan Road Clean culverts Lanes Tier Clean culverts Upper Mill Road

Occupational Health and	Monthly Toolbox Meetings			
safety	Day to day JSA and daily prestart check lists completed			
	Monthly workplace inspections completed.			
	Playground inspections			
	Traffic control training for all staff Recognition for prior learning on some plant tickets			
	Recognition for prior learning on some plant tickets			
	Traffic Management courses for all Works staff			
Bridges:				
Refuse / recycling sites:	Cover Hamilton Tip twice weekly			
Other:	Remove fallen tree Victora Valley Road			
	Repair water break Wayatinah			
	Commence gravel crushing Hamilton Quarry			
	Install new cattle grid Green Valley Road			
	Repair defect Dennistoun Road			
	Repair defect in Pelham Road Commence work on leak in Bothwell showers			
	Install sign Todds Corner			
	Removed fallen tree Ellendale Road			
	Clean out cattle grids, Green Valley Road, Humbie			
	Road and Woolpack Road			
	Repair cattle grid Interlaken			
	Septics pumped out Bethune and Dunrobbin toilets			
	Removed dead vegetation Bothwell township			
	Replace Dennistoun Road street blade			
	Repair septic tank Dunrobbin toilets			
	Replace Wayatinah Road street blade			
	Clean gutters and kerb Wayatinah			
	New BBQ shelter and refurbishment Wayatinah Park			
	Remove abandoned car from Derwent Bridge toilets			
Slashing:				
Municipal Town	Collection of town rubbish twice weekly			
Maintenance:	Maintenance of parks, cemetery, recreation ground and			
	Caravan Park.			
	Cleaning of public toilets, gutters, drains and footpaths.			
	Collection of rubbish twice weekly			
	Cleaning of toilets and public facilities			
	General maintenance			
	Mowing of towns and parks			
	Town Drainage			
	Town Brainage			

Buildings:	Install new hot water cylinder Bothwell Medical Centre
Plant:	PM843 Toyota Hilux service
	PM756 Kenworth truck rectify electrical problem
	PM733 Komatsu grader new tyres
	PM740 Hino truck replace rear hear box seal
	PM844 Fuso truck new tyres
	PM824 Toyota Hilux ute serviced
	PM845 Kenworth truck serviced
	PM753 Bomag compactor new injectors and head
	gasket
	PM748 Hino truck serviced
Private Works:	Greg Ramsey gravel
	Jayden Speed backhoe and truck hire
	Humbie Pastoral Vac trailer hire
	Truck hire R.V. Bowden and Son
	Grader hire Meadowbank Ski Club
	Grader hire Parsons Road
Casuals	Toilets, rubbish and Hobart
	Hamilton general duties
Program for next 4 weeks	Sheeting and grading of Municipal Roads
	Cleaning of culverts Municipal Roads
	Rectify drainage issues Miena area
	Garden Gretna War Memorial

14. OPERATIONAL MATTERS ARISING (STRATEGIC THEME – FINANCIAL SUSTAINABILITY

Manage Council's finances and assets to ensure long term viability and sustainability of Council

- 3.1 Manage finances and assets in a transparent way to allow the maximisation of resources to provide efficient and consistent delivery of services
- 3.2 Review annually, Councils Long Term Financial Management Plan and Council's Long Term Asset Management Plan
- 3.3 Where efficiency gains can be identified, resource share services with other local government councils
- 3.4 Endeavour to, and continue to lobby for, an increase in the level of grant income
- 3.5 Encourage development to expand Council's rate base
- 3.6 Identify revenue streams that could complement/substitute for existing resources
- 3.7 Develop and maintain sound risk management processes

14.1 MONTHLY FINANCE REPORT TO 31 JULY 2025

RESOLUTION 14/08.2025/C

<u>Moved</u>: Deputy Mayor J Allwright <u>Seconded</u>: Cr R Cassidy

THAT the Monthly Finance Report to 31 July 2025 be received.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

IMPLICATIONS AND FINANCIALS

Strategic Plan	3.1 Manage finances and assets in a transparent way to allow the maximisation of resources to provide efficient and consistent delivery of services	
Council Policy	Not applicable	
Legislative Context	The council's decision-making is under the provisions of the Local Government Act 1993, and the report details the basis for the recommendation	
Consultation	The financial statements form part of the public record within the Council minutes	
Impact on Budget/Resources	As attached	

Risk	The council must ensure that it meets its financial	
	obligations. This report captures the ongoing financial	
	performance	

REPORT BY Zeeshan Tauqeer, Accountant

BACKGROUND

Financial Expenditure Analysis Report - For the Period Ended 31 July 2025

Rates Reconciliation as at 31 July 2025

2024	2025
\$196,877.36	\$217,826.72
-\$145,341.00	-\$150,792.81
\$51,536.36	\$67,033.91
\$4,716,976.66	\$4,940,272.89
\$0.00	
\$2,088.33	\$476.25
\$4,719,064.99	\$4,940,749.14
\$591,275.02	\$847,086.44
	\$3,781.79
\$125,721.93	\$134,342.95
\$25.08	\$0.00
\$4,053,579.32	\$4,022,571.87
	\$196,877.36 -\$145,341.00 \$51,536.36 \$4,716,976.66 \$0.00 \$2,088.33 \$4,719,064.99 \$591,275.02 \$125,721.93 \$25.08

Bank Reconciliation as at 31 july 2025

	2024	2025
Balance Brought Forward	\$4,784,571.26	\$4,745,856.82
Receipts for month	\$3,844,884.87	\$1,811,283.84
Expenditure for month	\$1,969,842.18	\$2,133,762.52
Balance	\$6,659,613.95	\$4,423,378.14
Represented By:		
Balance Commonwealth Bank	\$3,899,960.80	\$1,438,101.87
Balance Westpac Bank	\$7,329.61	\$279,987.95
CBA Credit Card	V.,020.01	\$3,512.67
Investments	\$2,751,773.54	\$2,699,036.09
Petty Cash & Floats	\$550.00	3
	\$6,659,613.95	\$4,420,638.58
Plus Unbanked Money	\$0,000,010,000	¥1,120,000.00
	\$6,659,613.95	\$4,420,638.58
Less Unpresented Cheques	\$0.00	34,420,030.30
Unreceipted amounts on bank statements	\$0.00	0.
	\$6,659,613.95	\$4,420,638.58

			Comment In			BALANCE
lo.	Bank Accounts	Investment Period	Current In Rate %	terest	Due Date	2025
	11100 Cash at Bank and on Hand					
	11105 Bank 01 - Commonwealth - General Trading Accoun	nt				1,438,101.87
	11106 Bank 02 - Westpac - Direct Deposit Account					279,987.95
	1118 CBA Credit Card					3,512.67
	11199 TOTAL CASH AT BANK AND ON HAND					1,721,602.4
	11200 Investments					
	11207 Bank 6	0	i,	0.00		0.0
	11207 Bank 5	0		0.00		0.00
	11115 Bank 04	30		4.25%	28/08/2025	1,000,000.00
	11110 Tascorp	91		4.10%	29/07/2025	88,479.68
	11115 Bank 16	30	Ö	3.98%	25/08/2025	1,610,556.41
	11299 TOTAL INVESTMENTS				× × ×	2,699,036.09
	TOTAL BANK ACCOUNTS AND CASH ON HAND				00 207 30 -	4,420,638.58

Revenue & Expenditure Report
Central Highlands Council
For the period 1 July 2025 to 31 July 2025
For Department

0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4,955,364.41 730.18 5,775.81 698.18 1,025.45 356.36 1,956.66 4,894.75 109.09 11,336.00 207.27 10,054.00 1,350.00 394.00 1,359.64 4,995,611.80	4,955,364.41 730.18 5,775.81 698.18 1,025.45 356.36 1,956.66 4,894.75 109.09 11,336.00 207.27 10,054.00 1,350.00 394.00 4,995,611.80
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0.00	38,514.42	38.514.42
0.00	3,492.34	3,492.34
0.00	17.803.37	17.803.37
0.00	66,455.48	66,455.48
0.00	2,946.89	2,946.89
0.00	17.25	17.25
0.00	387.00	387.00
0.00	2.054.46	2.054.46
0.00		
0.00	16,071.64	16,071.64
	2,273.51	2,273.51
0.00	2,619.09	2,619.09
0.00	7,717.75	7,717.75
0.00	72,286.57	72,286.57
0.00	41,317.50	41,317.50
0.00	3,616.48	3,616.48
0.00	1,283.95	1,283.95
0.00	7,471.11	7,471.11
0.00	150,626.58	150,626.58
0.00	2,439.00	2,439.00
0.00	327.24	327.24
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		17.864.86
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Cash Flow Summary Central Highlands Council For the month ended 31 July 2025

Account	Jul 2025
Income	
61005 - General Rate	3,831,678.19
61010 - Fire Levy	255.606.70
61015 - Garbage	852,988.00
62005 - Rate Certificates	3,623.89
63005 - Rental Units, Housing, Office Bldgs	7,995.74
63010 - Planning Fees	9,238.00
63025 - Building Fees	816.00
63045 - Tip Fees	207.27
63050 - WTS Fees	566.44
63055 - Hall Hire	356.36
63065 - Recreation and Reserve Hire	109.09
63075 - Camping Ground Hire	698.18
63080 - Dog Licences, Fees and Fines	11,336.00
63085 - Licences, Fees - Food and Public Assembly	394.00
64020 - Grants - Other	1,350.00
66005 - Interest Received	11,218.32
67005 - Private Works	2,469.12
67020 - Pensioner Rate Remission	(3,750.06)
67030 - Reimbursements	10,470.70
67035 - Misc Income	866.05
Total Income	4,998,237.99
Less Expenses	
11130 - Propertwise control account	(7,871.11)
11305 - Rates Charges and Interest	4,016,457.50
11315 - Regulated Entities Debtors	(11,969.00)
11405 - Stock - Diesel	25,092.37
12307 - Capex Salary & Wages temp a/c	12,241.42
21130 - PAYE Tax - Payroll	27.137.00
21135 - Net Pay Holding - Payroll	996.48
21140 - Superannuation - Payroll	16,991.35
21210 - Bldg Levy and Industry Permits	(1,937.52)
21230 - Bothwell Exercise Group (BTW Wellness Group Inc)	1,363.64
21235 - Suspense	(1,289.00)
21305 - Current Provision LSL	(5,000.00)
21310 - Current Provision Annual Leave	(10,200.00)
21315 - Current Provision Sick Leave	(3,300.00)
71005 - Sal and Wages	193,237.89
71015 - Superannuation	23,179.76

71020 Uniform and Protective Clathing	440
71020 - Uniform and Protective Clothing	412. 9,000.
1035 - Annual Leave Sal	
1040 - LSL Salaries	5,000.
1045 - Sick Leave Sal	3,300.
1055 - Loading Taken Salaries	1,200.
1065 - Mileage	148.
1070 - FBT Paid	9,352.
1075 - Payroll Tax	14,384.
1080 - Workers Compensation Insurance	33,571.
2005 - Contractors	123,276.
2010 - Other Waste Contracts	49,533.
2020 - Plant & Equipment Maintenance	22,300.
2025 - Fuel	16,009.
2030 - Tyres	12,327.
2045 - Fuel Tax Re-imburse	(12,045.0
3005 - Consultants	7,603.
3010 - Materials	40,470.
3020 - Rates Print & Stationery	3,160.
3035 - Computer Maintenance	3,992.
3040 - Copier Maintenance	1,868.
3055 - Gravel	128,296.
3065 - Cylinder rental	408.
3070 - Meetings	750.
4010 - Mayors Allowances	3,274.
4015 - Deputy Mayor Allowances	1,923.
4020 - Other Councillors Allowances	6,549.
4025 - Elected Members Exp	415.
4035 - Energy	13.547.
4040 - Street Lighting	2,946.
4045 - Insurance	379.268.
4050 - Valuation Fees	750.
4055 - Tel and Comms	3,999.
4060 - Support/Donations	7.971.
4070 - Seminars / Conferences	529.
4075 - Training	20.500.
4080 - Insight	4.000
4085 - Petty Cash and Postage	1,413.
4090 - Licence Fees	374.
4110 - Rate Remission	12.055.
4115 - Rounding	(0.4
4120 - Subs/Membership	7.876.
4130 - Advertising	4,446.
4135 - Legal Fees	20,242.
	Table 1 to 1 t
4140 - Stationery	274.
4150 - Bank Fees & Charges (GST)	1,009.
4155 - Bank Fees & Charges (FREE)	152.
4160 - Council Rates, Water & Sewerage	23,376.
otal Expenses	5,266,348.
Surplus (Deficit)	(268,110.58)
Plus Other Cash Movements	
12320 - Capital Contractors	(5,791.73)
12330 - Capital Material Purchases	(5,557.77)
12340 - Capital Plant Hire/Fuel - External	(200.88)
Total Other Cash Movements	(11,550.38)
Plus GST Movements	
GST Collected	101,934.31
GST Paid	(144,752.05)
let GST Movements	(42,817.74)
let Cash Movement	(322,478.70)
NA SAGO ME CHIMIL	1022,410.10
Summary	1710 1170
Opening Balance	4,743,117.28
Plus Net Cash Movement	(322,478.70)
Cash Balance	4,420,638.58

Community Economic Development

Community & Economic Development 2025/2026 Budget

Project Code		BUDGET 2025/26	Expenditure until 31 July 2025	COMMENTS 2025/28
	Strategic Project-Whole of Community			
CREL313	Community & Economic Development Support	\$10,000	\$393	
CREL316	Health & Wellbeing Plan (2020-2025) Implementation	\$5,000	\$0	
CREL302	Econimic and Tourism Development Strategic Project	\$5,000		
	Youth and Children Strategic Projects			
CREL303	New- Family Day Care Seeding Fund Bothwell	\$5,000		
CREL304	New- Ouse Family Day Care Support	\$5,000		
	Youth Service & Activities	\$5,000		
CREL319	Children's Services and Activities	\$5,000	\$100	
CREL320	Bothwell High School Breakfast Club	\$2,000		
CREL321	Glenora School Breakfast Club	\$1,000		
	Westerway School Breakfast Club	\$1,000		
CREL323	New-Bothwell Playproup Support	\$1,000		
	Community & Donation and Financial Assistance			
CREL315	Community Grants	\$15,000		
CREL309	Community Support & Donations	\$10,000		
CREL324	Church Grants	\$5,000		
CREL311	Further Education Bursaries	\$1,400		
CREL325	School Awards	\$400		
	Central Highlands School Support	\$3,000		
	Community Event	, , , , , , , , , , , , , , , , , , ,		
CREL308	ANZAC Day	\$12,000		
CREL306	Australia Day	\$4,000		
CREL314	Community Event.eg Volunteer week	\$5.000		
	Community Partnerships	, , , , , ,		
CDEV366	Highlands Digest Support	\$15,800		
CREL327	Australasian Golf Museum contribution to power	\$5,000		
EDEV361	Visitors Centre Contribution to Power	\$5,000		
	Healthy Connect Project	\$10,000		
CREL317	Brighton Family Day Care	\$5,000	\$5,000	
	Total Community & Economic Development Support & Donations	\$141,600	\$5,493	

14.2 DONATION - CANCER RESEARCH CENTRE

Moved: Cr J Honner Seconded: Cr J Hall

THAT Council make a donation of \$500.00 to Cancer Research in remembrance of the Late Cr Anthony (Tony) Bailey.

RESOLUTION 15/08.2025/C

AMENDEMENT TO THE MOTION

<u>Moved</u>: Cr R Cassidy <u>Seconded</u>: Cr Y Miller

THAT Council make a donation of \$1000.00 to Cancer Research in remembrance of the Late Cr Anthony (Tony) Bailey

LOST

For the Motion

Deputy Mayor J Allwright,; Cr R Cassidy; Cr J Hall; and Cr Y Miller.

Agsinst the Motion

Mayor L Triffitt Cr A Archer Cr J Honner; Cr D Meacheam

RESOLUTION 16/08.2025/C

THE ORIGINAL MOTION WAS PUT AND CARRIED

Moved: Cr J Honner Seconded: Cr J Hall

THAT Council make a donation of \$500.00 to Cancer Research in remembrance of the Late Cr Anthony (Tony) Bailey.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

Report by Katrina Brazendale, Executive Assistant

BACKGROUND

As a request of the Late Tony Bailey at his funeral donations were taken for the Cancer Research Centre in honour of his passing. I therefore have requested that Council consider making a donation.

14.3 REQUEST FOR RATES REMISSION - PROPERTY NUMBER 10-0400-03595

RESOLUTION 17/08.2025/C

Moved: Deputy Mayor J Allwright **Seconded:** Cr J Hall

THAT Council remit the Solid Waste Garbage Fee on property 10-0400-03595, 137 Little Den Road Millers Bluff of \$216.00

LOST 8/0

Against the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

Report by Sharee Nichols, Senior Administration Officer

BACKGROUND

Council received an email from the owner of Property 10-0400-03595 137 Little Den Road Millers Bluff on the 22nd of July 2025 asking for a rates remission for the solid waste domestic charge \$216.00 on Property 10-0400-03595 at 137 Little Den Road Millers Bluff.

The owner states that if there was a waste facility close by, they would use it, however there is no Council waste management facilities near Millers Bluff on the eastern side of the municipality. Hence the property owner takes their waste back to Deloraine with them.

The owner requests that the waste charges be waved for the last 8 years and has been granted.

14.4 REQUEST FOR RATES REMISSION - PROPERTY NUMBER 03-0201-03706

RESOLUTION 18/08.2025/C

Moved: Cr J Honner **Seconded:** Cr R Cassidy

THAT Council remit the general rate charge of \$535.59 on property 03-0201-03706.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

Report by Sharee Nichols, Senior Administration Officer

BACKGROUND

Council has received correspondence from Inland Fisheries Service seeking a rates remission for the public toilet located at Woods Lake.

The toilet block at Woods Lake has been a great service to the community. The rates payable on the property leased by Inland Fisheries Service from Forestry Tasmania for a public toilet block are exempt from the fire levy and the garbage collection rate the only rates payable on the toilet block is the general rate charge of \$535.59.

Council has previously supported this request to remit the general rates on this toilet facility.

14.5 REQUEST FOR RATES REMISSION – PROPERTY NUMBER 04-0017-03967

RESOLUTION 19/08.2025/C

<u>Moved</u>: Cr R Cassidy <u>Seconded</u>: Cr J Honner

THAT Council remit the general rate and garbage rate of \$624.62 on Property Number 04-0017-03967

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

Report by Sharee Nichols, Senior Administration Officer

BACKGROUND

Mr John & Mrs June Pilcher have written to the General Manager requesting a Remission of Rates on Property Number 04-0017-03967 at Schaw Street, Bothwell.

For several years Council have resolved to remit the rates on this property for the full financial year.

Rates on the property are \$674.62

According to the Crown Lands Dept. this P.I.D. 1743535 is Last Street in Bothwell. The owner only uses a small portion of the street, part is still a public street, part is used by other residents and the bottom is flooded by Ratho Dam.

The owner pays a lease to the Department of Primary Industries, so they have to pay rates as well the convenience of the part that they use is not worth it – the owner continues to keep their section free of noxious weeds (ie: Gorse etc.).

The following Rates and Charges for 2025/2026 are as follows:

Garbage \$110.00 General \$514.62 Fire \$50.00

TOTAL \$674.62

The Fire Levy is Council's contribution and payment is passed onto the State Fire Commission pursuant to Section 93A of the *Local Government Act 1993* and charged as follows:-

- a) For land within the Bothwell Volunteer Brigade Rating District an amount of **0.30998** cents in the dollar on the assessed annual value of all separately valued parcels of rateable land subject to a minimum **\$50.00**; and
- b) For all other land in the Municipal area an amount of **0.2931** cents in the dollar on the assessed annual value of all separately valued parcels of the land subject to a minimum **\$50.00**.

14.6 ELECTRIC VEHICLE CHARGER AT BOTHWELL

RESOLUTION 20/08.2025/C

<u>Moved</u>: Cr D Meacheam <u>Seconded</u>: Deputy Mayor J Allwright

THAT Council authorise the Acting General Manager to sign and seal the agreement between Electrona Pty Ltd and Central Highland Council for the lease of the Bothwell electric vehicle charger site at the eastern end of 'Queens Park' Patrick Street, Bothwell.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

IMPLICATIONS AND FINANCIALS

Strategic Plan	3.1 Manage finances and assets in a transparent way to allow the maximisation of resources to provide efficient and consistent delivery of services	
Council Policy	Policy 2022–63 Climate Change Adaptation & Mitigation	
Legislative Context	Local Government Act 1993	
Consultation	Council's Senior Management Team	
Impact on Budget/Resources	As per 25/26 Council approved budget	
Risk	The council must ensure that it meets its legislative and governance responsibilities as per the Local Government Act 1993.	

REPORT BY Adam Wilson, Deputy General Manager

Attachment - Draft Agreement between Electrona Pty Ltd and Central Highland Council for the lease of the Bothwell electric vehicle charger site at the eastern end of 'Queens Park' Patrick Street, Bothwell.

BACKGROUND

Mr Stephen Poljansek, Director for Electrona Pty Ltd has written to Council asking for a formal agreement between Electrona Pty Ltd and Central Highland Council for a site lease at the eastern end of 'Queens Park' Patrick Street, Bothwell.

The time frame for implementing the electric vehicle charger site at the eastern end of 'Queens Park' Patrick Street, Bothwell will probably be approximately 5 months from the receipt of the signed Agreement, although much of that time frame is based on timing of availability of equipment and TasNetworks providing a new connection point.

Mr Poljansek respects the characteristics of the 'Queens Park' site and believes Electrona Pty Ltd can establish Bothwell as an electric vehicle gateway to the Central Highlands (particularly those considering travel on the Lakes Highway) and a magnet for these visitors.

At the May 2023 Council Meeting, Council agreed to the following regarding the electric vehicle charger at Bothwell:

RESOLUTION 25/05.2023/C

Moved: Cr R Cassidy **Seconded:** Deputy Mayor J Allwright

- 1. THAT Council support the installation of an electric vehicle at all three sites in Bothwell and Site 2 in Hamilton (in the existing council public car park, in the corner facing the public toilet amenities block in Hamilton) subject to any development application requirements; and
- **2. THAT** the General Manager provide Electrona Pty Ltd with a letter of support for the sites agreed by Council.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Bailey, Cr R Cassidy, Cr J Honner, Cr J Hall and Cr D Meacheam.

The next step is to confirm an agreement between Electrona Pty Ltd and Central Highland Council for the site lease.

15. OPERATIONAL MATTERS ARISING (STRATEGIC THEME – NATURAL ENVIRONMENT

Encourage responsible management of the natural resources and assets in the Central Highlands.

- 4.1 Continue to fund and support the Derwent Catchment Project
- 4.2 Continue with existing waste minimisation and recycling opportunities
- 4.3 Promote the reduce, reuse, recycle, recover message
- 4.4 Continue the program of weed reduction in the Central Highlands
- 4.5 Ensure the Central Highlands Emergency Management Plan is reviewed regularly to enable preparedness for natural events and emergencies
- 4.6 Strive to provide a clean and healthy environment
- 4.7 Support and assist practical programs that address existing environmental problems and improve the environment

15.1 DERWENT CATCHMENT PROJECT

RESOLUTION 21/08.2025/C

<u>Moved</u>: Cr J Honner <u>Seconded</u>: Deputy Mayor J Allwright

THAT the Derwent Catchment Project Report for July-August 2025 be received.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.



Derwent Catchment Project Council Report July -August 2025

General business

AGM and annual report

Invitations have been sent for this year's AGM, which will be held on Friday, 26 September at The Shed Restaurant, Derwent Estate Vineyard. We are pleased to welcome guest speaker Rebecca White. The 2024–25 Annual Report is now being finalised, and we look forward to sharing the year's achievements with you. The report will be sent out shortly.

Agri-best practice programs

Strategic Actions 4.7 Support and assist practical programs that address existing environmental problems and improve the environment.

Pasture Network

During this reporting period, the Pasture Network's efforts centred on finalising and delivering the commitments under our Climate Smart Agriculture project with NRM South. Despite having only five months to complete the first year's work, we successfully achieved all identified activities and outputs. The final deliverable analysed and interpreted a series of farmer interviews, which will guide future network activities.

These interviews reaffirmed strong support for the paddock-based learning and practical trial activities we have run in the past. They also highlighted a range of emerging topics and issues aimed at enhancing pasture and grazing system resilience in a variable climate. The excellent support from NRM South, combined with the strong working relationships we have developed, was critical to our success in meeting these milestones.

In parallel, we delivered a separate program of bridging activities while the Climate Smart Agriculture project was being contracted. This included three field days at trial sites and two evening BBQ events, funded through a small network grant from the Foundation for Rural & Regional Renewal.

Planning is now underway for a new series of activities. These include establishing "monitor paddocks" to trial identified management changes on a commercial scale, and organising a property visit to Ross to view drought-resilient phalaris in action alongside an alternative legume trial. One of our priorities will be to strategically harness the spring growth period to boost legume content, improve perennial grass vigour, and increase rooting depth—treating these as capital investments in future pasture productivity and resilience.

Weed Management Programs

Central Highlands Weed Management Plan

Strategic Actions 4.4 Continue the program of weed reduction in the Central Highlands, and 4.7 Support and assist practical programs that address existing environmental problems and improve the environment.

The Weed Action Fund application remains on hold while the formation of the new government is finalised. Although this has delayed formal decision-making, momentum is being maintained through ongoing communication and preparatory work. A planned meeting with major stakeholders was postponed, but a new date is being arranged for early September to re-engage, confirm priorities, and ensure progress continues. In the meantime, stakeholders are finalising budgets and refining project plans.

Restoration and Conservation

Strategic Actions: 4.1 Continue to fund and support the Derwent Catchment Project and 4.7 Support and assist practical programs that address existing environmental problems and improve the environment.

Rivers

Clyde River - Flood Resilience Project

A landholder meeting was held at Llanberis on Thursday 7 August, facilitated by Eve and hosted by Richard Hallett. The group agreed that while there have been many attempts to tackle willows on the Clyde over the years, without sustained investment and consistent onground management, the problem just keeps coming back. We discussed a whole-of-Clyde River Restoration Project, an ambitious goal that could be achieved in two stages.

Stage 1 would see the development of a river restoration plan as part of the three-year Flood Recovery Project. This plan, already costed into the grant, is essential for identifying safe areas to work on to reduce flood risk. It would include property-by-property priorities for flood mitigation willow control, debris management (including burning piles), and targeted restoration, guided by hydrological and geomorphology advice which is critical given the current role of willows in slowing floodwaters in some spots. The plans will also map out a staged approach for ongoing willow control and restoration with costings.

Stage 2 would focus on a long-term program as part of the Nature Repair Plan Pilot, which will be starting early next year, to attract investment through the nature repair market. Farmers are keen to co-contribute with machinery and labour to work in the more productive areas, while less accessible sites could be packaged as biodiversity projects to draw in alternative funding. Strategic revegetation and improved flood fencing, drawing on local farmer designs and lessons from the Tamar Estuary and Esk Rivers project, will also be important. Additional opportunities, such as NAB Green Loans, will be explored to support the work.

The next steps are to contact all Clyde landholders, as a couple were unable to attend the meeting, and to begin developing the property-by-property plans. We expect to be working on these over the next three months. Eve has organised time to discuss the project with the Clyde River Trust at their next meeting on 28th August.

Connecting to Land & Sea

The Connecting to Land & Sea work experience project began in late July, offering Aboriginal participants skills and experience in conservation, land management, and landscape restoration, supported by the Tasmanian Government. Developed in collaboration with the Southcentral Workforce Network, the eight-week program involves nine participants, which emphasises cultural landscapes and Aboriginal participation in land management.

Led in partnership with Luke Mabb, an Aboriginal man and advocate for cultural connection, land-based healing, and youth empowerment, the program combines traditional knowledge with modern practices. Luke, alongside DCP volunteer John Chaplin, provides on-ground support, mentoring, and guidance in Healthy Country principles. Training covers cultural awareness, chainsaw operation, brush-cutting, first aid, chemical handling, white card accreditation, communication, and conflict resolution, paired with practical fieldwork.

Participants will engage in activities including river repair on the Tyenna River, Healing Country at Green Point, weed control near the Jordan Nature Reserve, and plant propagation at DCP's Hamilton Nursery, building confidence, skills, and a strong foundation for ongoing work in land and waterway management.

Tyenna River Recovery

The Tyenna River Recovery Program has been boosted by trainees from the Land and Sea Program, facilitated by the DCP. These trainees have been building their river restoration skills by learning to identify and treat invasive willows along the Tyenna River. Through hands-on training, they have gained practical experience in improving waterway health, revegetating with native plants and implementing willow control to support long-term river recovery. Their contributions have built on the progress of the Willow Warriors, bringing fresh energy and capacity to the ongoing work of restoring the river and enhancing its natural values.

Hamilton Native Plant Nursery

Preparations are well underway at the nursery for the upcoming production season. Some of the winter-sown seed is now germinating and will soon be ready for pricking out. Large numbers of grasses and sedges are being sown to meet strong demand, particularly for river revegetation projects.

Our Connecting to Land & Sea trainees recently took part in a full day of nursery-based activities, including seed sorting and sowing, plant identification, and learning about plant growth cycles in a nursery environment. The nursery also supported National Tree Day, spending two days planting at Molesworth Primary School and building on the work started there last year.

Grant applications

Tasmanian Regional Drought Resilience – Quick Wins Grants Program 2025. The project, titled "Voices of Resilience," seeks to collect and share stories of drought, climate change, and adaptation from farmers and community members in Tasmania's Central Highlands and Derwent Valley. Outputs include a podcast series distributed online and via local radio, and a community BBQ to encourage further dialogue and connection.

The total amount requested for the project was \$13,000. (Pending)

16. OPERATIONAL MATTERS ARISING (STRATEGIC THEME – ECONOMIC DEVELOPMENT

Encourage economic viability within the municipality

- 5.1 Encourage expansion in the business sector and opening of new market opportunities
- 5.2 Support the implementation of the Southern Highlands Irrigation Scheme
- 5.3 Continue with the Highlands Tasmania and Bushfest branding
- 5.4 Encourage the establishment of alternative industries to support job creation and increase permanent residents
- 5.5 Promote our area's tourism opportunities, destinations and events
- 5.6 Support existing businesses to continue to grow and prosper
- 5.7 Develop partnerships with State Government, industry and regional bodies to promote economic and employment opportunities
- 5.8 Work with the community to further develop tourism in the area

Cr J Honner declared an interest and left meeting at 11.50 am.

16.1 DEVELOPMENT & ENVIRONMENTAL SERVICES

RESOLUTION 22/08.2025/C

Moved: Cr R Cassidy Seconded: Cr Y Miller

THAT the Development & Environmental Services Report be received.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr D Meacheam and Cr Y Miller.

REPORT BY Kathy Bradburn, Senior Administration

PLANNING PERMITS ISSUED UNDER DELEGATION

The following planning permits have been issued under delegation during the past month.

DISCRETIONARY

DA NO.	APPLICANT	LOCATION	PROPOSAL
2025/16	D Hills	Lake Repulse Road, Ouse (CT Extractive Indu 121681/1)	
2025/28	W Townsend	9 Linnet Street, Hamilton	Outbuilding
2025/35	S & C Finance Pty Ltd	8 Patrick Street, Bothwell	Change of Use to Visitor
			Accommodation

2025/36	C J Honner	7562 Highland Lakes Road,	Outbuilding
		Miena	

ANIMAL CONTROL

Total Number of Dogs Registered in 2024/2025 Financial Year – 966 Total Number of Kennel Licences Issued for 2024/2025 Financial Year – 52

2025/2026 Dog Registration Renewal have been issued and were due by 31 July 2025.

Statistics as of 08 August 2025			
Number of Dogs Impounded during last month 0			
Number of Dogs Currently Registered	764		
Number of Dogs Pending Re- Registration	183		
Number of Kennel Licence Renewals Issued	28		

REPORTS BY Beverley Armstrong, Environmental Health Officer

ANNUAL REPORTING

The following Annual Reports for Environmental Health have been submitted to DHHS as required:

- Private Water Report for 2024-2025
- Recreational Water Report 2024-2025
- Food Safety Annual Report 2024-2025
- EHO Annual Register submitted 2025
- Regulated Systems Central Highlands Council have no Regulated Systems.

All reports have been acknowledged and no issues have been raised at this time.

The annual waste report is currently being finalised due to be submitted at the end of September.

The Hamilton Landfill EMP Review 2025 has been completed and forwarded to the EPA and NRE, with no issues being raised at this time.

Cr J Honner returned to the meeting at 11.51 am.

16.2 TASWASTE SOUTH – QUARTERLY REPORT

RESOLUTION 23/08.2025/C

Moved: Cr R Cassidy **Seconded**: Deputy Mayor J Allwright

THAT Council received the quarterly report for the period ending 30 June 2025.

Attachment – Quarterly Report

BACKGROUND

In accordance with their obligations under our Rules and under s36B of the *Local Government Act 1993* the quarterly report must be provided to Council.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

17. OPERATIONAL MATTERS ARISING (STRATEGIC THEME – GOVERNANCE AND LEADERSHIP

Provide governance and leadership in an open, transparent, accountable and responsible manner in the best interests of our community

- 6.1 Ensure Council fulfils its legislative and governance responsibilities and its decision making is supported by sustainable policies and procedures
- 6.2 Ensure that Council members have the resources and skills development opportunities to effectively fulfil their responsibilities
- 6.3 Ensure appropriate management of risk associated with Council's operations and activities
- 6.4 Provide a supportive culture that promotes the well-being of staff and encourages staff development and continuous learning
- 6.5 Provide advocacy on behalf of the community and actively engage government and other organisations in the pursuit of community priorities
- 6.6 Consider Council's strategic direction in relation to resource sharing with neighbouring councils and opportunities for mutual benefit
- 6.7 Support and encourage community participation and engagement
- 6.8 Ensure that customers receive quality responses that are prompt, accurate and fair
- 6.9 Council decision making will be always made in open council except where legislative or legal requirements determine otherwise.

17.1 POLICY NO. 2014-20 MEDIA POLICY

RESOLUTION 24/08.2025/C

Moved: Cr J Honner Seconded: Cr Y Miller

THAT Council adopt Policy No. 2014-20 Media Policy.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

IMPLICATIONS AND FINANCIALS

Strategic Plan	6.1 Ensure Council fulfils its legislative and governance responsibilities and its decision making is supported by sustainable policies and
	procedures
Council Policy	Policy No. 2014-20 Media Policy

	Policy No. 2016–42 Model Code of Conduct Policy No. 2017–51 Staff Code of Conduct Policy	
Legislative Context	Context Local Government Act 1993	
Consultation	Council's Senior Management Team	
Impact on	As per 24/25 Council approved budget	
Budget/Resources		
Risk	The council must ensure that it meets its	
	legislative and governance responsibilities as per	
	the Local Government Act 1993.	

REPORT BY Adam Wilson, Deputy General Manager

Attachments - Policy No. 2014-20 Media Policy (DRAFT)

BACKGROUND

The previous Media Policy was approved by Council in the January 2022.

This Policy applies to Councillors, staff, committee members, volunteers and contractors of Council, and applies when acting in an official capacity on behalf of Council or where association with the Council is referred to or implied in a personal capacity.

The purpose of the policy is to:

- Ensure all communication with the media is consistent, fact based, well informed, timely, professional and appropriate;
- Clearly identify authorised spokespersons of Council;
- Improve communication with the community, including a focus on the pillars of accessibility, inclusivity and respect;
- Establish consistent methods for managing (including initiation and response) and monitoring communication; and
- Managing media and communication during times of crises and emergencies.

17.2 POLICY NO. 2025-67 SOCIAL MEDIA POLICY

RESOLUTION 25/08.2025/C

Moved: Cr R Cassidy Seconded: Cr J Honner

THAT Council adopt Policy No. 2025-67 Social Media Policy.

CARRIED 7/1

For the Motion

Mayor L Triffitt, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

Against the Motion

Deputy Mayor J Allwright

IMPLICATIONS AND FINANCIALS

Strategic Plan	6.1 Ensure Council fulfils its legislative and governance responsibilities and its decision making is supported by sustainable policies and procedures
Council Policy	Policy No. 2014-20 Media Policy
	Policy No. 2016–42 Model Code of Conduct
	Policy No. 2017–51 Staff Code of Conduct Policy
Legislative Context	Local Government Act 1993
Consultation	Council's Senior Management Team
Impact on	As per 24/25 Council approved budget
Budget/Resources	
Risk	The council must ensure that it meets its legislative and governance responsibilities as per the Local Government Act 1993.

REPORT BY Adam Wilson, Deputy General Manager

Attachments - Policy No. 2025-67 Social Media Policy (DRAFT)

BACKGROUND

The purpose of this policy is to provide understanding and guidance for the appropriate use of social media and applies to Councillors, employees, contractors, agents and volunteers of Council when acting in an official capacity and/or representing Council on social media platforms and in digital spaces.

This policy applies to the use of social media for:

- the purpose of conducting council business and when representing Council; and
- personal use where reference is made to Councillors, staff, policies and services, suppliers or other stakeholders or council-related issues.

The intent of this policy is to provide guidance on the appropriate use of social media platforms and tools in order to enable and encourage its use by Councillors, employees, contractors, agents and volunteers for the purpose of conducting council business.

The policy aims to:

- Promote effective and productive community engagement through social media;
- Provide guidance about the appropriate use of social media tools;
- Reduce the likelihood of miscommunication or inappropriate communications;
- Help manage new challenges associated with social media such as speed and immediacy, record keeping, artificial intelligence (AI), privacy and security; and
- Provide clarity about roles and responsibilities in relation to use, approval and monitoring.

17.3 COMMON SEAL ON LEASE - OLD TASWATER BUILDING BOTHWELL

RESOLUTION 26/08.2025/C

Moved: Cr J Honner **Seconded:** Cr Y Miller

THAT Council note that the Acting General Manager has used the Common seal for the signing of the lease for the old Taswater building at Bothwell.

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

REPORT BY Katrina Brazendale, Executive Assistant

BACKGROUND

Council has been in discussions with Rural Alive and Well for the usage of the old Taswater building at the carpark of the Bothwell Office that was being used for storage.

It was agreed by Stephen Mackey (Acting General Manager) that this would be on a 12-month trial period as an in-kind contribution to acknowledge Rural Alive and Well's services to the Municipal area.

This lease commenced on the 1st August 2025.

18. CONSIDERATION OF SUPPLEMENTARY AGENDA ITEMS TO THE AGEN	AGENDA	TO THE \imath	ITEMS T	AGENDA	_EMENTARY	N OF SUF	ONSIDERATION (18.
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Nil.

19. CLOSURE OF THE MEETING TO THE PUBLIC

RESOLUTION 27/08.2025/C

Moved: Cr J Honner **Seconded**: Cr R Cassidy

THAT pursuant to Regulation 15 (1) of the Local Government (Meeting Procedures) Regulations 2015, Council, by an absolute majority, close the meeting to the public to consider the following matters in Closed Session:

CARRIED

For the Motion

Mayor L Triffitt, Deputy Mayor J Allwright, Cr A Archer; Cr R Cassidy; Cr J Hall; Cr J Honner; Cr D Meacheam and Cr Y Miller.

Item Number	Matter	Outcome
2.1	Confirmation of the Minutes - Closed Session of the Ordinary Meeting of Council held on 15 July 2025.	Regulation 15 (2)(G) of the Local Government (Meeting Procedures) Regulations 2015 – information of a personal and confidential nature or information provided to Council on the condition it is kept confidential.
4.1	Electric Highway Tasmania Acquisition By National Roads And Motorists' Association	Regulation 15 (2)(G) of the Local Government (Meeting Procedures) Regulations 2015 — information of a personal and confidential nature or information provided to Council on the condition it is kept confidential.

PURPOSE

Under Regulation 15 (1) of the *Local Government (Meeting Procedures) Regulations 2015* states that at a meeting, a council by absolute majority, or a council committee by simple majority, may close a part of the meeting to the public for a reason specified in sub-regulation (2).

As per Regulation 15 (1) of the Local Government (Meeting Procedures) Regulations 2015, this motion requires an absolute majority.

MEETING CLOSED to the public at 12.14 pm.

20. RE-OPEN MEETING TO THE PUBLIC

The meeting re-opened to the public at 1.05 pm.

21. PUBLIC RELEASE ANNOUNCEMENT(S)

The Chairperson announced that pursuant to Regulation 15(8)(9) of the Local Government (Meeting Procedures) Regulations 2015 and having considered privacy and confidential issues, the Council authorised the release to the public of the following discussions, decisions, reports or documents relating to the closed meeting:

Item Number	Matter	Decision
2.1		THAT the Minutes of the Closed Session of the Ordinary Meeting of Council held on 15 July 2025 be confirmed
4.1	Electric Highway Tasmania Acquisition By National Roads And Motorists' Association	THAT the deed be signed by the Acting General Manager.

22. CLOSURE

Mayor Triffitt thanked everyone for their contribution and declared the meeting closed at 1.06 pm.

Mayor L Triffitt

Dated: 23 September 2025



Protecting the observing conditions at Siding Spring



Planning and Environment



Acknowledgement of Country

The New South Wales Government acknowledges the Traditional Custodians, the First Peoples of Australia, and pays respect to Elders past, present and emerging. We recognise that Aboriginal people have unique cultural and spiritual relationships to place and their rich contribution to Country.

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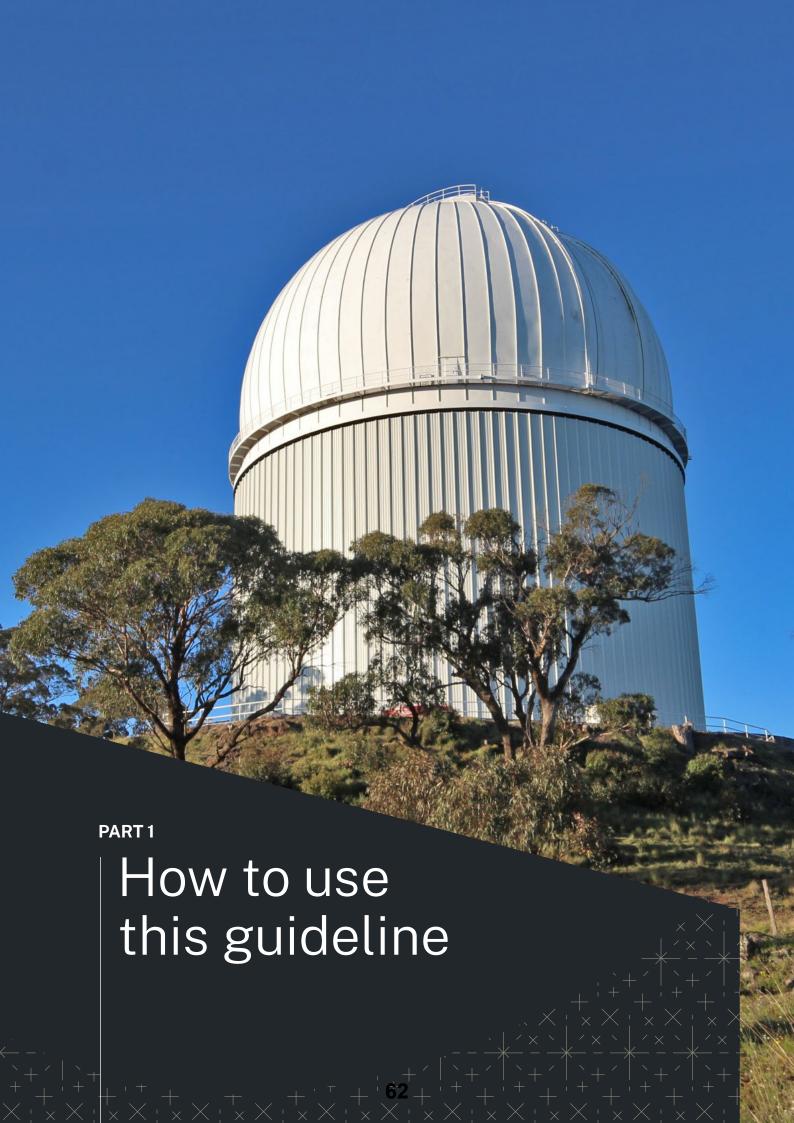
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1.1 Introduction

Figure 1: The Dark Sky region

The Dark Sky Region in NSW is centred on the site of Australia's most important visible-light observatory at Siding Spring, located on the edge of the Warrumbungle National Park. The observatory has over 40 telescopes and is one of few in the world that can observe the whole southern-hemisphere sky. It is critical to our understanding of the universe and the scientific endeavours of Australian and international astronomers. Each year the observatory attracts over 24,000 visitors and injects more than \$5 million directly into the local economy. Its continued operation depends on the night sky being free from light pollution. Light from developments in the Dark Sky Region has the potential to reduce how effectively the optical telescopes operate.

This guideline informs state and local government, industry and the community about managing light in the Dark Sky Region (Figure 1). It shows how we can manage light from development to reduce effects on the observatory's operation. The guideline informs development controls that apply to land within the local government areas of Coonamble, Dubbo Regional, Gilgandra and Warrumbungle, and the

assessment of significant development within 200 kilometres of the observatory. It supports the design and operation of development in the region and gives key information to ensure that lighting used in development does not reduce the effectiveness of the observatory.

The observatory and the neighbouring Warrumbungle National Park are part of Australia's first internationally accredited dark sky park. The accreditation—certified by the International Dark Sky Association—gives tourists more incentives to visit the region. The certification required robust community support for protecting the dark sky and an ongoing commitment to its preservation.

This guideline gives advice and technical information on good lighting design and encourages the use of shielded, downward-facing lighting that is appropriate for its site. The management of light in the Dark Sky Region is important because the telescopes at Siding Spring Observatory need clear, dark nights to work well. Good lighting also reduces energy waste and has environmental, health and economic benefits for communities and ecosystems.

The Anglo-Australian Telescope, Australia's largest on-shore optical telescope. Image courtesy of Ángel López-Sánchez.

1.2 Structure of the guideline

This guideline includes the following parts:

Part 2 – The Dark Sky Region

This part gives information about Siding Spring Observatory and how light from development in the Dark Sky Region affects its operation.

Part 3 – Factors affecting the observing environment

This part describes the key factors associated with artificial lighting that have the potential to affect the observing conditions at the observatory.

Part 4 – Good lighting design principles

This part sets out the design principles that must be considered in preparing, designing and assessing development that involves lighting.

The principles promote lighting practices that maintain a dark night sky and support the operation of the observatory as well as saving energy.

Glossary and Appendices

This part includes a glossary of key definitions, a Siding Spring Observatory location map, a table detailing the light output from common bulb types, references to resource documents and links to more information.

1.3 Who is this guideline for?

The NSW Department of Planning and Environment has prepared this guideline to:

- help planning professionals in state and local government assess development proposals
- guide planners, developers, builders and other professionals when preparing a development application in the Dark Sky Region
- inform the wider community about lighting practices that maintain a dark night sky.

Astronomy: role and importance

Astronomy is the observational and theoretical study of objects in space. It includes vast fields of knowledge in physics, chemistry and mathematics.

Professional and amateur astronomers study the whole universe, including the moon, planets, stars, galaxies, quasars and black holes. Knowledge gained from these studies helps us to understand the nature of the universe, from its origin 13.8 billion years ago to today. At the cutting edge of knowledge are profound questions on the nature of space and time, and whether there is life beyond the earth.

Astronomy is also an ancient science. associated with the earliest forms of time keeping, navigation and agricultural calendars. As a modern science, astronomy has improved our knowledge in physics and has allowed scientists to make advances in medicine, geology, solar energy, remote sensing and communications. It has stimulated the development of technologies such as digital cameras, wi-fi and laser technology. Astronomy also informs our understanding of the great care required to protect our planet's fragile environment for future generations. If astronomers can no longer study the universe from observatories like the one at Siding Spring due to light pollution, we will lose this important information and astronomical data.



1.4 When does the guideline apply?

A consent authority, such as a council, must consider the guideline when assessing development applications within the local government areas of Coonamble, Dubbo Regional, Gilgandra and Warrumbungle, under clause 61 of the Environmental Planning and Assessment Regulation 2021 (the Regulation).

A consent authority must also consider the guideline for:

- state-significant development
- · designated development
- development specified in State Environmental Planning Policy (Planning Systems) 2021, Schedule 6 (regionally significant development) that is likely to affect the night sky and is within 200 kilometres of Siding Spring Observatory.

The Regulation also requires a proponent to consider the guideline when preparing an environmental impact statement for state-significant infrastructure on land less than 200 kilometres from the observatory.

Clause 5.14 of the Coonamble, Dubbo Regional, Gilgandra and Warrumbungle local environmental plans sets out the matters that consent authorities must consider when assessing development. These considerations aim to minimise light pollution and protect observing conditions at the observatory.

Lighting requirements

Lighting requirements for exempt and complying development are set out in the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 and vary depending on the distance from the observatory and the type of development proposed. Certifying authorities must ensure that the lights installed in a development comply with certain standards when issuing an occupation certificate for complying development. The consent authority must consult with the observatory director for certain types of lit development (see section 1.5 below).

The guideline will help consent authorities consider the impacts of lighting associated with a development application. To manage contribution to artificial skyglow, the consent authority may impose conditions for the:

- · design of light fittings
- shielding of light
- design and operation of development
- · hours of lighting operation.

Other matters to consider

Other considerations may include:

- the design of roads
- dust mitigation
- night-time operations for extractive industries, coal seam gas and other development types.

Refer to Appendix A for the possible conditions of consent the department has developed.

1.5 Consultation requirements

Consent authorities must consult with the observatory director where a development has the potential to affect the observing conditions at the observatory for large projects such as state-significant infrastructure or designated development within the Dark Sky Region.

Under the State Environmental Planning Policy (Transport and Infrastructure) 2021, proponents must consult with the observatory director for specified development that may increase the amount of artificial light in the night sky on land within 200 kilometres of the observatory. This aims to ensure that these developments apply best-practice lighting.

Clause 5.14 of the Coonamble, Dubbo Regional, Gilgandra and Warrumbungle local environmental plans (LEPs) also requires consultation with the observatory director for certain types of development. Consent authorities must also seek concurrence from the Secretary of the Department of Planning and Environment before granting development consent for a development that is likely to emit over 1 million lumens, such as supermarket car parks, sports fields, commercial stock yards and transport terminals.

We recommend that you discuss your proposal with your local council to find out if you need to consult with the observatory.

1.6 Where to find more information

Appendix D Useful publications and references has more information on the types of lighting that maintain a dark night sky and the effect of light on astronomical observations.

Where appropriate, we recommend that you consult with your local council at an early stage in the design process to ensure suitable lighting design and installation. You may need to consult with the observatory where you expect a more significant impact.





2.1 Overview

This part includes information about the observatory and how light from development in the Dark Sky Region affects its operation.

The Dark Sky Region consists of the land within a 200-kilometre radius of Siding Spring Observatory (see Figures 1 and 2). Good lighting design within the Dark Sky Region supports the successful functioning of the observatory. Lighting design is important because the steady increase in light pollution from distant and nearby light sources affect observing conditions and operation of the observatory. Lights with a direct line of sight to the observatory and those which shine above the horizontal plane of a light fitting have particularly negative effects on observing conditions.

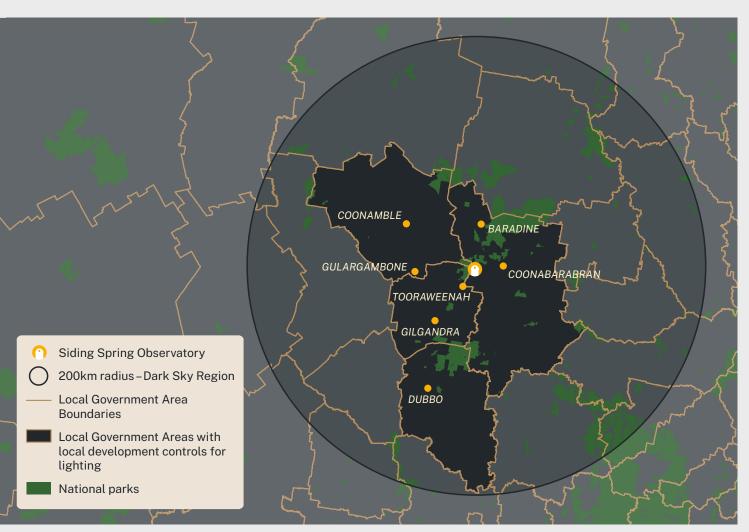


Figure 2: Map illustrating the application of local controls for lighting in the Dark Sky Region

2.2 Siding Spring Observatory

The observatory's location is an important vantage point for studying time variables and explosive phenomena such as supernovae (exploding stars), and other astronomical sources.

It is located on the eastern boundary of the Warrumbungle National Park (see Figure 2) in the Warrumbungle Range. Both the observatory and the national park are part of Australia's first internationally accredited dark sky park.

The observatory is surrounded by the flat plains of Coonamble and Gilgandra Shires and the undulating terrain of Coonabarabran. The Timor Valley is situated to the east of the observatory and comprises a mixture of rural farmland, rural residential development and undeveloped bushland.

The town of Coonabarabran is about 20 kilometres east of the observatory. Other surrounding centres include Baradine, Coonamble and Gulargambone to the north and north-west, and Tooraweenah, Gilgandra and Dubbo to the south. There are large areas of nature reserve and state forest to the north and north-east.

The telescopes at the observatory are owned and operated by a wide range of agencies including the Australian Government, Australian and overseas universities and privately funded enterprises. There are more than 40 telescopes on the site. The Anglo-Australian Telescope is the largest optical telescope in Australia and has a mirror diameter of 3.9 metres, while the 1.2-metre UK Schmidt Telescope is the third largest wide-angle telescope in the world. Both telescopes are operated by the Australian National University. Other large telescopes on the site include the university's 2.3-metre Advanced Technology Telescope and the 2-metre Faulkes Telescope South, which provides internet-accessible observing services for schools. Despite advances in the exploration of the universe from space, there will always be a need for ground-based facilities.



▲ Image courtesy of Ángel López-Sánchez

2.3 The impact of light on the observatory

In the night sky, there are 2 types of light: natural and artificial. Both contribute to skyglow that affects astronomical observations.

Natural skyglow is the brightness of the night sky that is created by natural light sources such as the sun and the moon. It is primarily caused by activity in the upper atmosphere and occurs in the night sky regardless of light from any human-made structure.

The darkness of the sky varies with natural events, but the benchmark of natural skyglow is the amount measured at the minimum of the solar cycle, when the sky is at its darkest.

Artificial skyglow is the brightness of the night sky created by light from human-made sources.

It is the result of light from urban and regional development that is scattered and has interacted with molecules, aerosols and particulate matter in the atmosphere. Outdoor lights that shine into the night sky increase artificial skyglow the most. Interior lights can also contribute where windows, skylights or openings are uncovered.

Advances in astronomy rely on the use of telescopes to detect and observe very faint objects in the depths of the universe. Discoveries and measurements of such objects by large telescopes need a pristine sky, free from light pollution. Increased artificial light in the night sky mean that at some of the world's major observatories, particularly in the northern hemisphere, faint objects can no longer be observed.

2.4 Impact of existing and future development on the observatory

NSW has one of the highest levels of light pollution in Australia. In the Dark Sky Region, lights from large urban centres, rural towns and developments, significant infrastructure and resource projects are visible from the observatory. The growth of towns and industries in the Dark Sky Region presents challenges for ensuring the dark night sky is free from light pollution and increased levels of atmospheric dust.

It is through the development assessment process that the applicant and the consent authority consider the effects of lighting associated with development. Part 4 of this guideline gives the design principles that apply to lighting, which the applicant must consider when preparing a development application, or an activity under the State Environmental Planning Policy (Transport and Infrastructure) 2021.

Rural development

Many activities associated with agriculture in the surrounding rural area, including grazing livestock and producing crops, generally emit only low levels of light into the atmosphere and have a minimal impact on levels of artificial skyglow. Rural industries and intensive livestock agriculture operations including greenhouses, dairies, feedlots, piggeries and poultry farms generally require more significant levels of lighting and, if not properly shielded, are likely to contribute to artificial skyglow.

Dust associated with rural industries and some extractive industries can disperse light at night. The design and management of sites and development must minimise dust to reduce light pollution.

Urban development

Urban development, including sports fields, industrial and commercial buildings, housing, advertising signage and street lights, has a significant effect on the level of artificial skyglow. The nearest urban centre in the Dark Sky Region is the town of Coonabarabran, which is about 20 kilometres east of the observatory. Other nearby urban areas include Baradine, Coonamble, Narrabri, Gunnedah, Tooraweenah, Gilgandra and Dubbo. Because they are near the observatory, light-generating activities associated with the growth of housing and industry in these areas have the potential to significantly increase levels of artificial skyglow.

This guideline sets out the reasons for development standards within the local government areas of Coonamble, Dubbo Regional, Gilgandra and Warrumbungle. It also helps proponents, planners and consent authorities consider if a development is likely to hinder observing conditions at the observatory.



Illuminated signage

Illuminated signage can contribute significantly to artificial skyglow and has the potential to increase with the emergence of high-efficiency, high-output lighting such as light-emitting diodes (LED) lighting. Consideration of lighting design and operation is especially important for this type of lighting.

There are several types of illuminated signs, including LED signs, fluorescent tubes and those that are illuminated from the interior. While it is hard to shield these signs because of their orientation, proponents can reduce the impact on the night sky by adopting the following:

a. Luminance level

Signs must comply with AS/NZS 4282, Control of the obtrusive effects of outdoor lighting. During night hours, signs should not be illuminated within 18 km of the observatory.

b. Monitoring

Owners of illuminated signage should continuously monitor signs including the reliability of hardware, software, network and other support infrastructure.



▲ Image courtesy of Ángel López-Sánchez

c. Size limits

Larger illuminated signs have a proportionally greater effect on the night-time environment. The size of a sign should be appropriate for its purpose.

d. Shielding

Where practical, a roof or shield should be constructed over the top of the sign. This does not eliminate all upward light spill but can reduce it.

e. Light curfews

Where practical, light curfews should be adopted. This can include the use of timers which switch off the illuminated sign at a certain time, for example after 9.00pm.

Skylights and solar tubes

Skylights and solar tubes can let light inside a house escape outside. To prevent light escaping into the night sky, skylights should be fitted with automated blinds and solar tubes with shutters.

A skylight or roof window is not permitted as exempt or complying development on land within the local government areas of Dubbo Regional, Coonamble, Gilgandra and Warrumbungle.

Mining and extractive industries

Other major emitters of light in the Dark Sky Region include mining and extractive industries, in particular gas flares on gas fields. The operation of these projects must maintain clear skies and consider air quality, dust emissions and night-lighting impacts, including light from flares, rail or truck movements. Night operation of this development has the potential to increase skyglow and will need effective management.

Exempt and complying development

Exempt and complying development carried out under the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 also has certain limitations, exclusions and specific development standards for lit development within the local government areas of Coonamble, Dubbo Regional, Gilgandra and Warrumbungle.



3.1 Overview

This part describes the ways artificial lighting can affect the observing conditions at the observatory.

There are 4 key factors:

- the distance between the light source and the telescope
- · the quantity of light
- the type of light emitted
- the direction in which the light shines.

These factors are measurable and can be considered and managed in land use and development assessment.

3.2 Distance between the light source and the telescope

The distance between the light source and the telescopes at the observatory is the most critical factor in determining the level of artificial skyglow. Sky brightness reduces rapidly the farther the light source is from the observatory. For example, the impact of light emitted from a single dwelling 1 kilometre from the observatory can be comparable to 150 dwellings located 20 kilometres away.

Lighting areas

To control the impact of lighting from development within critical distances of the observatory, 3 different lighting areas are applied to land in the local government areas of Coonamble, Dubbo Regional, Gilgandra and Warrumbungle. These areas are defined by clause 5.14 of each council's LEP as:

- a) 0 km to 12 km from the observatory
 –where a maximum of 4 shielded outside lights
 of no more than 900 lumens each is appropriate
- b) 12 km to 18 km from the observatory
 —where a maximum of 4 shielded outside lights
 of no more than 1,800 lumens each is appropriate
- c) Farther than 18 km from the observatory

 where a variety of light controls apply, relevant
 to the type of development and the potential
 impact on the observatory.

A Siding Spring Observatory Location Map in Appendix C illustrates the 0 km to 12 km and 12 km to 18 km radii from the observatory.

On land more than 18 kilometres from the observatory, a dwelling, secondary dwelling, or each dwelling in a dual occupancy, must have no more than 7 shielded outside light fittings with at least 2 of these light fittings automatically activated by a sensor. A household should not have more than 5 outside lights that are not activated by a sensor. These measures ensure that light emitted from both an individual development, and the cumulative effect of light emissions, do not hinder the observing conditions at Siding Spring Observatory.

Within 18 kilometres of the observatory, certain unlit developments are permitted as exempt development. This includes fencing, cubby houses, unlit greenhouses, mailboxes and other low-impact development.

A development requiring lighting within 18 kilometres of the observatory will require a development application and its design must incorporate measures to manage light pollution.

Skylights and roof windows

A skylight or roof window is not permitted as exempt or complying development on land within the 4 local government areas. A skylight or roof window may be considered as part of a development application and conditions attached to a consent. For example, skylights may be permitted if they can be fully blocked out with a blind. Skylights (including 'solar tubes') can let light in the house escape outside. To prevent light escaping into the night sky, skylights can be fitted with blinds and solar tubes can be fitted with shutters.

▼ Night use Day use 🔆

Kelvin colour temperature	2700K	3000K	3500K	4100K	5000K	6500K
Associated effects and moods	ambientintimatepersonal	• calm • warm	• friendly • inviting	precisecleanefficient	• daylight • vibrant	• daylight • alert
Appropriate applications	• living / family r • commercial / h		kitchen / bath Light commercial	• garage • commercial	• comm • indust • institu	rial

Table 1: Colour temperatures and appropriate uses

Note: LEDs can produce any colour temperature, but warm colours are preferred.

Most preferred

3.3 Quantity of light

The observing conditions at Siding Spring are directly affected by small amounts of light within the Dark Sky Region.

The effect of individual sources of light on the level of artificial skyglow is cumulative. Detailed computer modelling can estimate the cumulative effect of artificial light on the level of skyglow at any given landmark.

At the observatory, a threshold figure of 10% of the natural skyglow at 30 degrees above the horizon has been adopted as the maximum tolerable level of artificial light.

The Astronomical Society of Australia has ratified this threshold, which is critical to assessing impacts on observing conditions at the observatory.

For development with 24-hour operations, proponents must implement night-lighting measures to manage cumulative impacts.

The table in Appendix B of this guideline gives the quantity of light associated with bulb types, expressed in lumens.

3.4 Type of light emitted

A variety of light bulbs are available for different applications. The most common bulbs used for outdoor lighting include LEDs, high-pressure sodium, low-pressure sodium, fluorescent and incandescent.

Least preferred

The major difference between the types of bulbs is the distribution in light wavelength. This accounts for the different colour of light. For example, a highpressure sodium bulb gives a peach-coloured light, while a metal halide bulb produces a whiter light.

The perceived colour of light, ranging from blue to white and yellow is referred to as colour temperature.

As the atmosphere scatters blue-rich light the most, outdoor lighting should have a colour temperature below 3,500 Kelvin to reduce the effect of light on the observing environment. Table 1 gives information on light colour temperature.

3.5 Direction of light

Changing how a light fitting is mounted and aimed can reduce artificial skyglow.

When light shines below the horizontal plane of the light fitting, there is a dramatic reduction in the level of artificial skyglow produced. The design of light fittings and buildings, and the use of landscaping, can also support good lighting outcomes, directing light where it is needed. Local suppliers now stock a range of shielded light fittings for residential, commercial and industrial applications.

To control spill light, it is better in most situations to select a greater mounting height, a narrow beam and an appropriate vertical aiming angle (refer to Figure 3).

On average, 14% of light that is shielded is reflected off surfaces into the sky. The amount reflected varies greatly, depending on the type of surface. For example, a clay tennis court will reflect much more than a bitumen road. The reflective properties of ground and wall surfaces should also be considered to minimise reflected light.

Particles of dust in the atmosphere also affect the direction in which light travels. When lit, fine particles of dust scatter light, which may contribute to skyglow. Where development has the potential to generate dust, the proponent must carefully consider lighting design to ensure that dust will not be illuminated. Figure 4 depicts dust particles redirecting light towards the observatory.

Where dust emissions could affect observing conditions at Siding Spring, proponents and consent authorities should implement measures to minimise dust, including through conditions on an approval.

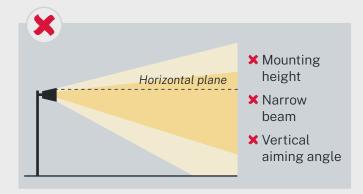




Figure 3: Application of mounting height and vertical aiming angle to control light spill

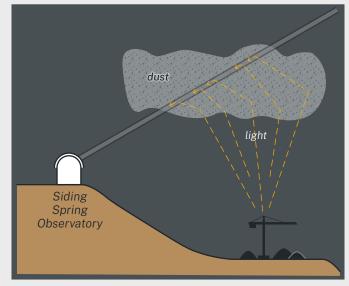


Figure 4: Scattering of artificial light by dust in the atmosphere





4.1 Overview

This part sets out the design principles that proponents, consent authorities and planners must consider when preparing, designing and assessing development.

Good lighting design follows the following principles:

- 1. Light must have a clear purpose
- 2. Eliminate upward spill light
- 3. Direct light downward, and avoid light trespass
- 4. Use shielded fittings
- 5. Avoid excess lighting
- 6. Switch lights off when not needed
- 7. Use energy efficient bulbs
- 8. Use asymmetric beams
- 9. Direct lights away from reflective surfaces
- 10. Use warm white colours

◀ Image courtesy of Ángel López-Sánchez



4.2 The design principles

Principle 1 Light must have a clear purpose

Before installing or replacing a light, decide if the light is needed. There must be a clear justification; lighting should serve a beneficial purpose and not be unnecessary.

Consider how the use of light will affect the surrounding area. Lighting should be appropriate for its setting and not light beyond where it is needed.

Common purposes for lighting include safety (road lighting), lighting an activity (sports field lighting) or creating an ambiance. Table 2 lists typical levels of light associated with common outdoor activities.

Before installing or replacing a light, consider the purpose of the light by deciding:

- · when the light is used
- how the use of light will affect the surrounding area
- where the light should be directed.

If there are alternative sources of light (torches, indoor light spill, fluorescence, cats' eyes, etc.) or if the light is used rarely, consider if permanent lighting is necessary. If you do need to introduce light, it should be appropriate for its setting in luminance and intensity and light only where it is needed.

◀ Image courtesy of Ángel López-Sánchez

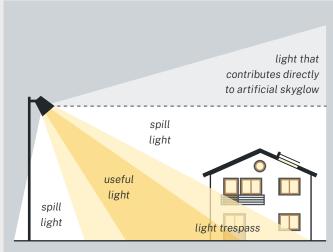


Figure 5: Common aspects of light pollution

Principle 2 Eliminate upward spill light

Spill light is light that falls outside the area that you intend to light. Spill light from the internal and external lighting of a development can cause glare, light trespass (see Figure 5), and wastes energy. Spill light above the horizontal plane contributes directly to artificial skyglow.

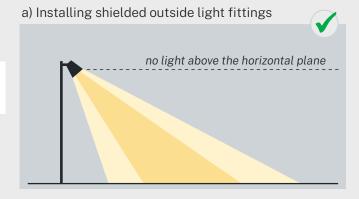
All light fittings should be located, aimed or shielded to avoid lighting unintended areas, especially above the horizontal plane of the light fitting (see Figure 5).

Proponents can prevent light from shining above the horizontal plane by:

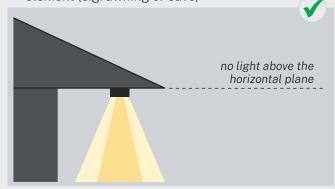
- installing light fittings with an opaque cover and flat glass, mounted horizontally on both axes
- mounting the light under part of a building such as an awning, verandah or roof, so that light is blocked from shining above the horizontal plane
- designing buildings to internalise light and prevent it from escaping into the night sky
- using a blind or shutter to prevent light escaping from skylights and solar tubes

Adequate measures to avoid and minimise interior light escaping through windows, roof windows, sliding doors and skylights include full block-out curtains, blinds or shutters. Consent authorities should impose suitable conditions to manage the spill of internal light into the night sky.

Figure 6 gives design solutions to minimise light spill above the horizontal plane. Figure 7 shows examples of upward light spill ranging from the worse case to the best.



b) Installing outside light fittings under a building element (e.g. awning or eave)



c) Using building design e.g. verandahs and block-out blinds to control the spill of internal lighting

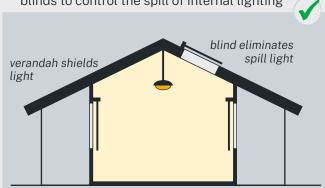


Figure 6: Design solutions to minimise interior spill light above the horizontal plane



Figure 7: Examples of upward light spill ranging from the worst case (left) to the best case (right)

Principle 3 Direct light downwards and avoid light trespass

Wherever possible, light should be directed downwards, not upwards. This includes light used for roads, public amenities and the vertical lighting of structures such as advertising boards and building facades. If there are special reasons that make up-lighting necessary, proponents must show that the light will not spill into the night sky. This may be achieved by using a wide overhang to the building that stops the light shining directly into the night sky or by moving the lights to shine down the building façade to achieve the same effect.

Directional fittings (for example, floodlights, spotlights and sign lights) should be installed so that they do not shine directly into a neighbouring residence, onto a roadway, skyward or outside a property boundary. They should also be installed in such a way that they do not shine directly up into skylights, solar tubes or roof windows.

To keep glare to a minimum, use higher mounting heights that allow lower main beam angles that are closer to vertical.

The lighting of all night operations such as mines, extractive industries and intermodal hubs need to be downward-facing, peach-coloured and shielded. Where strong light is needed or there are gas flares or burning associated with the development, proponents must consult with the observatory director to find an appropriate way to light the development.

Principle 4 Use shielded fittings

Proponents should use light fittings that are designed to minimise light shining near or above the horizontal plane.

Shielded fittings are those that do not allow any light above the horizontal plane. Figure 8(a) shows a fitting with a completely exposed bulb, allowing light to shine in all directions. Figure 8(b) shows a bulb that has a partial shield, minimising light above the horizontal plane and 8(c) shows a shielded fitting that allows light to project downward only. The shielded fitting is the preferred design in the Dark Sky Region.

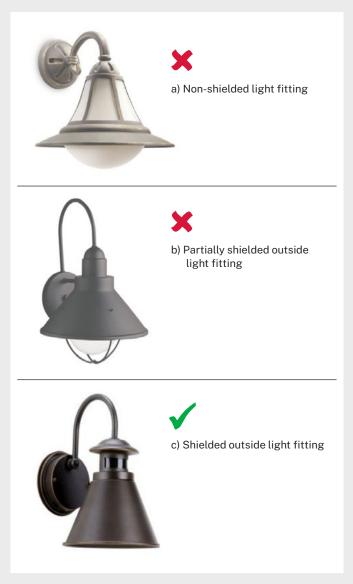


Figure 8: Shielding characteristics of light fittings

To verify the effective light distribution or shielding characteristics of a light fitting, refer to the manufacturer's specifications.

In some urban locations, particularly within heritage conservation areas, outdoor lights have a decorative cover. These designs may leave the bulb completely exposed and allow light to shine in all directions. To minimise light spill, the bulb should be fitted into the top of the fitting, allowing only the downward projection of light (see Figure 9).

Lighting suppliers stock a range of shielded light fittings suitable for residential, commercial and industrial applications.

If a supplier cannot provide a shielded fitting, a shielding device should be applied. Most outside light fittings are equipped with or are capable of being fitted with a baffle, visor or hood to ensure light is appropriately directed (see Figures 10 and 11).



Figure 9: Exposed bulb that allows light to shine in all directions and a fitting designed to minimise light spill by only allowing downward projection of light



Figure 10: Floodlight fitted with shielding attachment



Figure 11: Floodlight that incorporates shielding in the fitting design (no attachment necessary)

What is a light fitting?

A light fitting, or luminaire, is the complete lighting unit. It includes the bulb, elements designed to give light output control such as a reflector (mirror) or refractor (lens), the ballast, housing and the attached parts.

Where multiple light fittings are mounted on a single base, as illustrated in (b) below, these are to be counted as additional light fittings. For example, a dwelling with 7 outside light fittings may have 3 type (a) light fittings and 2 type (b) light fittings, of which 2 must be automatic light fittings.



Principle 5 Avoid excess lighting

To avoid excess lighting, select a suitable bulb type and light the area used for the task, rather than lighting the broader environment.

Improvements in technology mean that many new bulb types produce significantly more light while using equivalent or smaller amounts of energy. Halogen bulbs produce more light than standard incandescent bulbs for the same energy use. LED lights produce between 2 and 5 times the amount of light as incandescent bulbs. Careful selection of bulb type will ensure the amount of light produced is appropriate for what is needed.

Self-illuminating signs also have the potential to significantly contribute to artificial skyglow. Self-illuminating signs come in several types. They can be internally lit, made of fluorescent tubes that have been bent into words or other shapes, or be LEDs. LEDs are becoming more common. While it is hard to shield these signs, proponents can reduce the effect on the night sky by:

- turning lights off at night if they are not needed
- using the night setting of LED lights when they are on at night
- adding a roof over the top of the sign. This does not eliminate all upward light spill, but it can reduce it

The amount of light produced (lumen), rather than the amount of energy used (watt) is the most important consideration in ensuring that an area is not lit excessively. Table 2 gives an appropriate light output for common activities as a guide. For common bulb types and their associated lumen output, refer to Appendix B.

Table 2: Typical levels of outdoor lighting for common activities

Activity type	Lumens emitted
Dwelling	1,800 to 7,200
Single porch light	900
Tennis court (domestic purposes)	100,000
Farm building	1,800 to 7,200
Single security light	900 to 4,000
Swimming pool	12,000
Public open space /small car park	12,000
Small sports oval (single field)	1,000,000
Road lighting	Refer to AS/NZS 1158
Rural industries	Less than 1,000,000
Stockyards (commercial)	Less than 1,000,000
Mining and extractive industries	More than 5,000,000
Advertising signage (externally lit)	1,800 to 7,200
Small motel or commercial building	12,000
Recreational, decorative, promotional and special events lighting	No greater than necessary

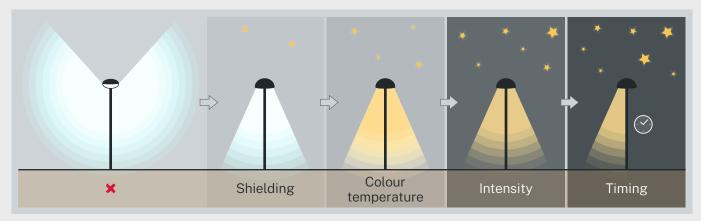


Figure 12: Key lighting terms

Principle 6 Switch lights off when not needed

Lights should be switched off when they are not needed. We encourage the use of light curfews, which restrict the hours of lighting. Examples include extinguishing or dimming advertising, decorative lighting and illuminated signage after 9.00 pm. We also encourage using light fittings with timers that switch on at dusk and switch off by 9.00 pm.

We also encourage using lights that are activated by a sensor and switch off automatically after a period as they reduce the cumulative amount of light emitted from development. This is beneficial for the observatory and reduces energy waste.

Where night lighting is necessary – for example, for development with 24-hour operations or for safety and security purposes – proponents need to take measures to manage cumulative impacts.

Principle 7 Use energy efficient bulbs

Improvements in technology mean that many bulb types use significantly less energy to produce the same amount of light.

Energy efficient globes include LEDs, metal halide, induction bulbs, high-pressure sodium, linear and compact fluorescent. High-pressure sodium lights emit a peach-coloured light and are suitable for various applications. They are energy efficient and have a lower impact than white lights.

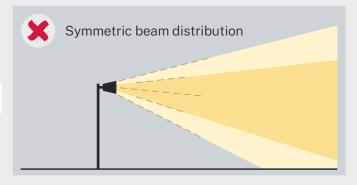
White lights such as LEDs, modern fluorescent lights and metal halide lights should be used where recognising colour is important, including pedestrian crossings, major road intersections and sports grounds. Blue-white mercury bulbs have commonly been used for roadway lighting, but are no longer permitted in new installations.

An Australian Standard (AS/NZS 1158) addresses lighting for roads and public spaces, including parks and gardens, and must be applied, where relevant.

Principle 8 Use asymmetric beams

Where floodlights are needed – for example, sports lighting applications and commercial stock yards – use fittings with asymmetric beams that permit horizontal glazing wherever possible. Keep these at or near parallel to the surface being lit, usually the ground. Only light the area that needs to be lit, preventing spill light (see Figure 13).

An asymmetric beam also allows the light fitting to be mounted on the edge of an area and avoids the need to tilt fittings upwards. Install flat glass light fittings with the glass horizontal to make efficient use of the brightest part of the beam, eliminate spill light and minimise light trespass.



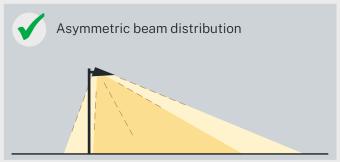


Figure 13: Appropriate floodlighting design includes use of an asymmetric beam

Principle 9 Direct lights away from reflective surfaces

At the design stage, it is preferable to select surfaces with a low level of reflectivity near outdoor lighting, compatible with the area's function.

Illuminance is a measure of the amount of light reflected by a surface and is determined by its reflective properties. Where a natural grass surface is used, the illuminance will be low, but may be significant where the surface is relatively light in colour–for example, uncoloured concrete, artificial grass with sand infill or light-coloured walls. Table 3 gives a guide to the reflective properties of common surfaces.

Table 3: Reflective properties of common surfaces

Surface	Reflective properties
Natural grass and vegetation	Low
Painted surface (dark)	Low
Pre-coloured factory metal (dark)	Low
Brick (dark)	Low
Raw or stained timber	Medium
Stone surface	Medium
Uncoloured concrete	High
Painted surface (light)	High
Artificial grass (sand base)	High
Pre-coloured factory metal (light)	High
Brick (light)	High
Coated steel (unpainted)	High

Principle 10 Use warm white colours

Use warm-coloured light bulbs. Avoid using cool, bluerich, high-colour temperature bulbs, as these create the most light pollution.

Table 1 gives more information on colour temperature.

Compliance for existing light installations

Where an existing lighting installation is inconsistent with these guidelines, one or more of the following measures may be necessary:

- a. To reduce light spill, adjust the lighting horizontally by reducing the aiming angle.
- b. Replace the bulb with a lower output one to improve lighting control.
- c. Install a device such as hood, screen or louver to reduce emission of high-intensity light.
- d. Use physical barriers to reduce light spill for example, trees, fences, earth mounds, shade cloth or screens.

Where existing fixtures are replaced, the project should show how it will reduce light pollution, or at a minimum, not increase it.

Glossary

Artificial skyglow is that part of the night sky's brightness that is caused by human-made sources of light.

Baffle is an opaque or translucent element to shield a light source from direct view, or to prevent light reflecting from a surface such as a wall.

Brightness is a subjective sense of how strongly a lit surface emits light to the naked eye.

Bulb is the source of electric light and is a part of a light fitting, not a light fitting on its own.

Candela is the international unit of measurement for the intensity of light. A candle emits light with a luminous intensity of approximately one candela.

Colour temperature is the perceived colour of a light source ranging from cool (blue) to warm (yellow), measured in degrees Kelvin (K). A low colour temperature such as 2,500 K will have a warm appearance, while 6,500 K will appear cold and harsh.

Horizontal plane means the horizontal plane passing through the centre of the light source (for example the bulb) of the light fitting.

Illuminance is the amount of light reflected from a surface.

Incandescent bulb is a bulb that gives light by using an electric current to heat a filament to a high temperature.

Intensity is the amount of energy or light in a given direction.

Light is the radiant energy that is visible to humans and animals. Light stimulates sight and makes things visible.

Light fitting is the complete lighting unit. It includes the bulb; elements designed to control light output, such as a reflector (mirror) or refractor (lens) and the ballast; the housing and the attached parts.

Light pollution means the brightening of the night sky caused by artificial light.

Light trespass happens when the spill light is cast where it is not wanted.

Lumens are a measure of light output from a bulb. The quantity of lumens a bulb produces is independent of the wattage. Some types of bulb are more energy efficient than others and produce more lumens per watt. Appendix B of this guideline gives lumen values for common bulb types.

Luminance is the amount of light emitted in a given direction by the light source or illuminated surface. This is measured in candelas per square metre.

Lux is the unit of measure for illuminance, equal to one lumen per square metre.

Natural skyglow is that part of the night sky's brightness that is caused by radiation from the stars and moon and luminescent processes in the Earth's upper atmosphere.

Mounting height is the height of the fitting or bulb above the ground.

Outside light fitting means a light fitting that is attached or fixed outside or on the exterior of a building or structure, whether temporary or permanent.

Reflected light is light that bounces off a surface. Light-coloured surfaces reflect more light than dark-coloured ones.

Shielded light fitting means a light fitting that does not allow light to shine above the horizontal plane and prevents light trespass. If a development will use a fitting that is not shielded, some form of permanent physical opaque shield must be used to stop light trespass. This can be a cover or part of a building. Adjacent surfaces, if they are lightly coloured, must also be shielded to stop excessive reflected light from adding to skyglow. The shielding should be constructed to minimise emissions in the 10 degrees below horizontal.

Skyglow is the brightness of the night sky caused by the cumulative impact of reflected radiation (usually visible light), scattered from the constituents of the atmosphere in the direction of observation. Skyglow has 2 separate components: natural and artificial skyglow.

Spill light is light that falls outside the boundaries of the object intended to be lit. Spill light serves no purpose and, if directed above the horizontal plane, contributes directly to artificial skyglow.

Wattage is the amount of electricity needed to light a bulb. Generally, the higher the wattage, the brighter the light will be and the more lumens it will produce.

Appendix A

Example content for conditions of consent for local councils surrounding Siding Springs Observatory

The following text is an example of what a consent authority could include in conditions of consent on a notice of determination (decision) for lit development. Advisory notes can also be used by councils to make proponents aware of requirements and guidance related to light pollution. For more information, please contact your local council.

Hours of operation:

During ongoing use, the hours of operation of any illuminated signage associated with the development must be restricted so that no light is emitted from the development after 9:00 pm, until sunrise.

Maintenance of light fittings:

During ongoing use, any future maintenance of light fittings associated with the development, must be consistent with the Department of Planning and Environment's Dark Sky Planning Guideline (as amended from time to time).

Light bulb colour:

Before the issue of an occupation certificate, documentation must be provided to the satisfaction of the certifier that all lighting associated with the development will have a colour temperature of no more than 3,000 K (that is, warm white to orange).

Lighting direction:

Before the issue of an occupation certificate, documentation must be provided to the satisfaction of the certifier that demonstrates lights are not directed towards reflective surfaces or cause nuisance to other residences or motorists in the surrounding area from light spill. The documentation must be provided to the certifier.

Appendix B

Lumen values for common bulb types (general lighting)

Light output (Lumens)	Power (Watt)					
	Incandescent	Tubular florescent bulb	Compact florescent bulb	LED		
150	25	N/A	N/A	N/A		
250	N/A	N/A	N/A	N/A		
400	N/A	N/A	7	N/A		
460	40	N/A	N/A	N/A		
600 to 700		N/A	N/A	9		
890	60	N/A	N/A	N/A		
900			13			
1,000	N/A	N/A	13 to 18	6 to 7		
1,190	N/A	N/A	N/A	N/A		
1,210	75	N/A	N/A	N/A		
1,200		N/A	18	15		
1,750	100	N/A	N/A			
1,800			26	18		
2,050	N/A	30	N/A	N/A		
2,450	N/A	36	N/A	N/A		
2,880	150	N/A	N/A	N/A		
2,900	N/A	N/A	32	N/A		
3,000	N/A	39	N/A	N/A		
3,700	N/A	50	N/A	N/A		
3,900	N/A	52	N/A	N/A		
4,600	N/A	55	N/A	N/A		
5,400	N/A	70	N/A	N/A		
6,300	N/A	75	N/A	N/A		
6,360	300	N/A	N/A	N/A		
23,800	1,000	N/A	N/A	N/A		

Note: Industrial and sportsground lighting requires specialist design with a variety of different bulb types

Appendix C

Siding Spring Observatory location map

This map is a composite representation of the Siding Spring Observatory Location Maps for Coonamble, Gilgandra and Warrumbungle LEPs. It shows the 0 km to 12 km and 12 km to 18 km distance bands from the observatory where particular lighting measures apply.

On land beyond the 18 km radius from the observatory, a range of lighting measures apply within the local government areas of Coonamble, Dubbo Regional, Gilgandra and Warrumbungle. These are set out in the relevant LEP.



Legend

- Siding Spring Observatory
- 0 km to 12 km radius from the observatory
- 12 km to 18 km radius from the observatory
- Local government boundary

Appendix D

Useful publications and references

Australasian Dark Sky Alliance (ADSA) https://www.australasiandarkskyalliance.org/

ADSA Approved Lighting https://www.australasiandarkskyalliance.org/adsa-approved

Australian National University, Research School of Astronomy and Astrophysics rsaa.anu.edu.au

Dark Sky Society www.darkskysociety.org

Department of Climate Change, Energy, the Environment and Water, National Light Pollution Guidelines for Wildlife https://www.dcceew.gov.au/sites/default/files/documents/national-light-pollution-guidelines-wildlife.pdf

Illuminating Engineering Society and International Dark Sky Association, Model Lighting Ordinance with User Guide (2011) www.darksky.org/outdoorlighting/mlo

International Dark Sky Association www.darksky.org

Light Pollution Science and Technology Institute, The night sky in the world, satellite monitoring of the artificial night sky brightness and the stellar visibility (2000) www.lightpollution.it/dmsp/

Meredith P (May 2015) 'The end of darkness', Australian Geographic, Issue 126

Nixon D (2008) Lighting and Light pollution simulator, Need Less Campaign

www.britastro.org/dark-skies/

Standards Australia, Australian Standard 4282-1997: Control of obtrusive effects of outdoor lighting

Standards Australia, Australian Standard/New Zealand Standard 1158: Lighting for Roads and Public Spaces

Standards Australia, Australian Standard 2560: Sports Lighting General Principles

Sydney Outdoor Lighting Improvement Society www.solis.org.au

The Astronomical Society of New South Wales Incorporated, Light Pollution Awareness www.asnsw.com/node/747

Planning and Environment

dpie.nsw.gov.au

Postal Address: Department of Planning and Environment Locked Bag 5022 Parramatta NSW 2124

Street Address: 4 Parramatta Square 12 Darcy Street Parramatta NSW 2150



COUNCIL POLICY STREET LIGHTING POLICY



PURPOSE

This policy sets target lighting standards for the Glenorchy City municipality, based on the Australian Standard for Lighting of Roads and Public Spaces.

SCOPE

This policy applies to:

• The lighting of roads, footpaths, car parks and outdoor public spaces.

STRATEGIC PLAN ALIGNMENT

Valuing our Environment

Strategy 3.1.3 Manage the City's transport network and the associated infrastructure to promote sustainability, accessibility, choice, safety and amenity for all

modes of transport.

RELATED DOCUMENTS

N/A

STATUTORY REQUIREMENTS

Acts	Local Government (Highways) Act 1982 - Sections 32 & 33
Regulations	N/A
Australian/International Standards	AS/NZS 1158.0:2005 Lighting for roads and public spaces Introduction AS/NZS 1158.1.1:2005 Lighting for roads and public spaces Vehicular traffic (Category V) lighting - Performance and design requirements AS/NZS 1158.1.2:2010 Lighting for roads and public spaces Vehicular traffic (Category V) lighting - Guide to design, installation, operation and maintenance AS/NZS 1158.2:2020 Lighting for roads and public spaces Computer procedures for the calculation of light technical parameters for Category V and Category P lighting AS/NZS 1158.3:1:2020 Lighting for roads and public spaces Pedestrian area (Category P) lighting - Performance and design requirements AS/NZS 1158.4:2015 Lighting for roads and public spaces Lighting of pedestrian crossings AS/NZS 1158.5:2014 Lighting for roads and public spaces Tunnels and underpasses



DEFINITIONS

Lighting Categories Defined in AS/NAZ 1158.0.2005 and associated standards:

- Category V lighting for vehicular traffic is applicable to roads on which the visual requirements of motorists are dominant, e.g. traffic routes. Subcategories range from V1 to V5.
- Category P lighting for pedestrian areas is applicable to roads on which the visual requirements of pedestrians are dominant, e.g. local roads and to local area traffic management devices (LATMS) installed on such roads. Also lighting, which is applicable to outdoor public areas, other than roads, where the visual requirements of pedestrians are dominant, e.g. outdoor shopping precincts. Subcategories range from:
 - PR1 to PR6 for road reserves
 - PP1 to PP5 for pedestrian and cyclist paths
 - PA1 to PA3 for public activity areas
 - PE1 to PE3 for connecting elements
 - PC1 to PC3/PCD/PCX for outdoor car parks

Local area traffic management devices (LATMS) means Devices installed on the carriageway as part of a local area traffic management scheme. They are typically used to control specific traffic movements, (e.g. roundabouts, speed humps) and to deter traffic, (e.g. slow points). These may consist of raised or surface-painted sections or a combination of the two.

Carriageway means That portion of the road devoted particularly to the use of vehicles, inclusive of shoulders and auxiliary lanes.

Luminaire means Apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except for the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electrical supply.

POLICY STATEMENT

Minimum Applicable Lighting Standards

- 1. When vehicular traffic is dominate (Category V), such as on arterial, main roads, subarterial or principal roads, then the lighting category is to be based on the road hierarchy and in accordance with AS/NZS 1158.1.1:2005.
- 2. Lighting of pedestrian crossings is to be in accordance with AS/NZS 1158.:2015 and associated AS1158 standards.
- 3. When pedestrians are dominant (Category P) the lighting category is subjective to selection criteria including activity, risk of crime and the need to enhance prestige. Therefore, the following target design lighting categories apply:



Type of Area	Target Design Lighting Category
CBD footpaths	PR2
Primary footpaths	PR3
Secondary footpaths with high night-time pedestrian movements	PR3
Secondary footpaths	PR5
Local footpaths	PR5
Footpaths identified as having frequent night-time movements of vulnerable individuals or groups	PR5
Replacement of existing luminaires on existing electrical distribution poles	PR6
Night-time use cycle paths	PP4
Major facilities with mixed pedestrian movements (e.g. bus station)	PA2
Major entertainment venues (e.g. cinema complex)	PA2
Immediate vicinity of night-time sporting venues	PA3
Right of ways within new subdivisions	PE2
Major night-time use car parks (frequent night-time movements)	PC2
Designated spaces for people with disabilities in major night-time use car parks	PCD

- 4. If there is an overlap between Category P and V lighting, then Category V lighting will take priority, except for CBD footpaths.
- 5. For rural roads, appropriate lights will only be placed in strategic locations, such as intersections, bus stops, telephone boxes and shops.
- 6. Right of Ways will only be considered for lighting on request from the wider community or if there is a significant safety issue associated with inadequate lighting.
- 7. For all new developments, the lighting shall be in accordance with AS 1158 and to the satisfaction of Council's Development Engineer.
- 8. This Policy is to be read in conjunction with Council's Footpath Policy which defines the Footpath Hierarchy including CBD Centre, Primary, Secondary and Local. Any deviations from this Policy, written consent shall be obtained from Council's Manager of Infrastructure, Engineering & Design.
- 9. The use of the word "target" is to provide guidance on the desired standard, but also provide flexibility to deliver value for money to the community and to allow innovations in design. The targets can be increased if the overall cost is not prohibitive or deceased in certain circumstances where the cost is prohibitive, so that Council can provide a safe and affordable service to the community.
- 10. Council is committed to allocate an annual budget as part of its capital works program and will assess the requests received from the community and carry out the work based on the priority.
- 11. Council is committed to the use of energy efficient and smart technology, for example, LED lights, motion detection and reduced light pollution where possible and practical.



12. Council encourage the use of high standard lighting presentation by private businesses and property owners.

BACKGROUND

Council is the Road Authority which is responsible for managing the local highways defined under the *Local Government (Highway) Act 1982* and associated Council-owned assets (e.g. public stormwater drainage and street lighting).

The objective of providing lighting within the road reserve is to provide a lighted environment that is conductive to the safe and comfortable movement of vehicular and pedestrian traffic at night. Proper lighting applications also play an important role in the discouragement of anti-social behaviour and protecting the integrity of the night-time environment through control of light spill and glare. Lighting may also be used to enhance the prestige and amenity of a location but should be designed to minimise any obtrusive effects.

Australian Standards such as *AS/NZS 1158 Lighting for Roads and Public Spaces* and other associated standards set out the principles of street lighting in Australia and detailed design criteria.

However, it is the Road Authority's responsible to set the appropriate design lighting category (Level of Service), based on advice contained in the Standard, and therefore the Glenorchy City Council has developed and maintained a Street Lighting Policy, which defines minimum design lighting categories for the municipality.

Council developed a Street Lighting Policy in 2015 (Street Lighting Policy 2015) in line with AS/NZS 1158 and associated standards.

Since AS/NZS 1158.2 and 1158.3.1 have recently been updated in 2020 and supersedes the 2015 editions, the Street Lighting Policy 2020 has been developed and updated to suit the new standards.

Lighting for vehicular traffic and pedestrian crossings are clearly defined in AS/NZS 1158.1.2 and AS/NZS 1158.4 respectively, and no additional guidance around lighting standards is required. However, lighting for pedestrian areas is much more subjective, requiring the user to assess the area against several selection criteria including activity, risk of crime and the need to enhance prestige. Therefore, target lighting standards have been defined in this Policy.

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RECONSTRUCTING THE STAR KNOWLEDGE OF ABORIGINAL TASMANIANS

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Abstract: The canopy of stars is a central presence in the daily and spiritual lives of Aboriginal Tasmanians. With the arrival of European colonists, Tasmanian astronomical knowledge and traditions were interrupted and dispersed. Fragments can be found scattered in the ethnographic and historical record throughout the nineteenth century. We draw from these ethnohistorical documents to analyse and reconstruct Aboriginal astronomical knowledge in Tasmania. This analysis demonstrates that stars, the Milky Way, constellations, dark nebula, the Sun, Moon, meteors and aurorae held cultural, spiritual and subsistence significance for the Aboriginal cultures of Tasmania. We move beyond a monolithic view of Aboriginal astronomical knowledge in Tasmania, commonly portrayed in previous research, to lay the groundwork for future ethnographic and archaeological fieldwork with Aboriginal elders and communities.

Keywords: Cultural Astronomy; ethnoastronomy; Indigenous Knowledge Systems, Aboriginal Australians, Tasmania **Warning to Australian Aboriginal Readers:** This paper contains the images of Aboriginal people who have died.

"Aboriginal Tasmanians spoke of the subject of stars with great zest." (George Augustus Robinson, 13 March 1834).

1 INTRODUCTION

The study of Indigenous Knowledge Systems can reveal a wealth of information about how scientific information is encoded into oral tradition and material culture (Agrawal, 1995), particularly with respect to astronomical knowledge (Cairns and Harney, 2003; Fuller et al., 2014; Hamacher, 2012; Norris, 2016). The continued study of Aboriginal and Torres Strait Islander astronomical knowledge, and the traditions though which this knowledge is passed to successive generations, has led to a more detailed understanding of how the Sun, Moon and stars aided navigation, seasonal calendars, food economics, animal behaviour, social structure, sacred law, and relationships between the land and the sky (Johnson, 1998). This is done through the various methodologies and theoretical frameworks of cultural astronomy, an interdisciplinary academic field that seeks to understand the role and use of the stars in culture (Ruggles, 2015).

Ethnohistorical literature is one of the primary sources for studying and reconstructing Indigenous astronomical knowledge (Hamacher,

2012). Aboriginal Australians are considered to be among the oldest continuous cultures, and the most researched Indigenous people on the Earth (Smith, 1999: 3), with records of language, customs, and traditions going back to before European colonisation in 1788. However, these records are highly biased, as Aboriginal people were considered to be among the lowest rung of human cultures by the colonists. This false position, and the rapid decimation of Aboriginal people and culture after British colonisation, lead to the practice of 'salvage anthropology', where ethnographers sought to record Aboriginal traditions before the people and cultures 'disappeared', sometimes with minimal regard for the secrecy or sacredness of that knowledge. This led to a rather large body of published information about Aboriginal cultures. Unfortunately, much of the astronomical knowledge from these records is highly fragmented and incomplete. A lack of formal training or understanding of astronomy by these ethnographers means much of the recorded information is filled with conflated terminology, misidentifications, incorrect assumptions, and transcription errors.

Aboriginal Tasmania has long been a place of contrasts, contention and devastation (Ryan, 1996). Colonialism, dispossession, genocide, and disease nearly wiped out Tasmania Aborig-

inal people (who call themselves 'Palawa', the name of the first man created from a kangaroo by a creator spirit). Before the arrival of Europeans, it is believed Aboriginal people arrived in Tasmania over 40,000 years ago (Pope and Terrell, 2007) when the island was connected to mainland Australia by a land bridge (see Orchiston, 1979a, 1979b; Murray-Wallace, 2002).

Approximately 8,000 years ago, rising sea levels created the island of Tasmania, separating the Palawa from mainland Aboriginal people. It is believed that the Palawa remained relatively isolated until European contact and subsequent colonisation (Johnson et al., 2015: 16). Groups were spread across about nine territories (Johnson et al., 2015: 36): Northeast, Ben Lomond, North Midlands, Oyster Bay, Southeast, Big River, North, Northwest, and Southwest (Figure 1). Within each of these territories existed smaller groups tied through marriage, kinship, and language, led by a respected male elder (ibid).

Relatively little is known about Palawa cultures prior to colonisation. Ethnographic studies were limited and the focus of colonial presence in Tasmania became one of complete Aboriginal removal from the island. Following a series of conflicts between colonists and Aboriginal Tasmanians in the early nineteenth century—a period known as the Black War-a builder and evangelist named George Augustus Robinson was hired from 1829 to 1834 to find the remaining Palawa living in Tasmania, facilitate their 'peaceful surrender', then relocate them to Flinders Island. This 'Friendly Mission' was accomplished by 1835 and many of the 200 relocated Palawa died from poor health and the prison-like conditions in which they were held. This had a devastating impact, resulting in the near decimation of Palawa culture, traditions and languages. In the time since, a cultural revival has taken hold and a resurgence of Palawa language, archaeology, history and culture is rapidly growing.

Because of colonisation, disease, dispossession, and genocide, we know relatively little about Palawa astronomical knowledge. Most of the archival information is ethnohistorical in nature, having been recorded by colonists and missionaries from their Aboriginal contacts. And much of that is fragmented, incomplete, sometimes ambiguous, and always recorded through the lens of the coloniser. Some traditional knowledge has survived with the Aboriginal people, who continue to pass their traditions on to successive generations.

This paper attempts to sort through the fragments of astronomical knowledge from Aboriginal Tasmanians scattered throughout the ethnohistorical literature and archives, reanalyze them using established and emerging methodologies from cultural astronomy, and attempt to reconstruct this knowledge to the best of our ability (although we acknowledge our limitations in this endeavor). This will serve as a base for further ethnographic and archaeological studies in the future, with application to education and cultural revival.

2 METHODOLOGY

This research draws upon ethnohistorical documents and published material in the literature, including newspapers, library and museum archives, and any associated media that makes any mention of astronomical objects or phenomena with respect to Palawa traditions. No ethnographic fieldwork was conducted for this project.



Figure 1: Map of major Tasmanian regions at the time of first European contact (Wikimedia Commons).

We identify the original Aboriginal sources of information, and link the accounts, narratives or descriptions whenever possible. Two kev sources of information were Mannalargenna, a leader of the northeast Palawa, and Woorrady, a Nuenonne man from Bruny (Brune) Island/ Lunawanna-Alonnah. They guided Robinson through Tasmania in the 1830s. As they spoke of their people's culture, Robinson recorded it in his journals. Much of the cultural knowledge was recorded during a period of rapid growth of the colony. As such, many of Robinson's (and others') records do not name the Aboriginal sources of these oral traditions. Sometimes only the region from which the tradition was recorded is provided.

The people in Table 1 are potential sources of astronomical knowledge despite not being

Table 1: Palawa who accompanied Robinson on his mission and expedition who are likely sources of the recorded information in Robinson's journals. Timler was not part of Robinson's expedition, but is cited as a source of oral traditions by Cotton (1979).

Name	Image	Details			
Bullrer Other Names: Drummernerlooner Rumanaloo Jumbo Louisa		Life: ca 1812- ??? (> 1845) Bio: Pairrebeenne woman from Tebrikunna in the far northeast of Tasmania. She was regarded as a highly-intelligent woman who spoke English well. Bullrer joined Robinson's expedition in 1830 when she was 18 as one of eight guides, and she also assisted the military with Line operations. She was the daughter of Bullrub/Poolrerrener, a Pairrebeenne clanswoman. She later married Calamarowenye. Further Reading: http://www.utas.edu.au/telling-places-incountry/historical-context/historical-biographies/bullrer			
Calamarowenye Other Names: Kalamaruwinya Tippo King Tippo		Life: ca 1812-1860 Bio: Man from the Big River region and husband of Bullrer. He participated in guerrilla attacks against the colonists during the Black War. He kept the jawbone of his murdered brother as a protective amulet, but it was taken by Robinson. Further Reading: http://tacinc.com.au/wp-content/uploads/2015/11/Mumirimina-People-of-the-Lower-Jordan-Valley-12.9.1029.4.12.pdf			
Kickerterpoller Other Names: Kikatapula Black Tom Tom Birch	No picture available	Life: ca 1803-1832 Bio: Paredarererme man kidnapped by colonists at age 9. He broke free in 1822 and joined the Aboriginal resistance against the colonists. He joined the Robinson expedition because of his multi-lingual abilities. Further Reading: http://www.utas.edu.au/telling-places-in-country/historical-context/historical-biographies/kickerterpoller			
Mannalargenna <i>Other Names:</i> Unknown	744.5	Life: ca 1775-1835 Bio: Leader of the Pairrebeenne clan (Cape Portland) in northeast Tasmania. He led guerrilla attacks against the colonists during the Black War and was part of Robinson's team. He was considered a 'clever man' and it is believed that his secret intentions were to lead Robinson away from the people Robinson was trying to find and relocate. Further Reading: http://www.utas.edu.au/telling-places-incountry/historical-context/historical-biographies/mannalargenna			
Marlapowaynererner Other Names: Maulboyheenner Timmy Timme		Life: ca 1825–1842 Bio: Son of clan leader Raleleeper from Georges Rocks who joined the Robinson expedition in 1830, serving until 1835. He joined Tunnerminnerwait in Victoria and was charged with killing two whalers. He was hanged in Melbourne Gaol on 20 January 1842, along with Tunnerminnerwait. Further Reading: http://www.utas.edu.au/telling-places-incountry/historical-context/historical-biographies/timme			

Tanleboneyer

Other Names:

Sall Maria



Life: ca 1807-1835

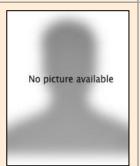
Bio: A Loontiteermairreloinner clanswoman from Oyster Bay. She became Mannalargenna's second wife in 1830 at age 23. She and Mannalargenna joined Robinson's group in late 1831 and remained until 1835. In August 1835 she fell ill and died at age 28.

Further Reading: http://www.utas.edu.au/telling-places-incountry/historical-context/historical-biographies/tanleboneyer-sall

Timler

Other Names:

Unknown



Life: Unknown. Alive in 1830s

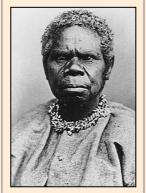
Bio: Timler was an elder of the Big River people who recounted some of his stories to Joseph and Isobel Cotton in the 1830s. He was regarded as one of the most powerful clansmen in Tasmania, but was not a member of Robinson's expedition.

Further Reading: Cotton (1979)

Truganini

Other Names:

Lalla Rookh Lydgudggee Trugernanner Trukanini Trucanini



Life: ca 1812-1876

Bio: A Nuenonne woman from Bruny Island, Trugannini was well versed in English and joined Robinson's party in 1829. She was Woorrady's wife and daughter of Mangana, the Bruny Island leader. Truganini suffered a life of abuse, rape and violence. In 1838, she formed a small band of guerilla fighters against the colonists. She narrowly avoided execution, but was imprisoned for 20 years on Flinders Island and a further 17 at Oyster Cove camp.

Further Reading: http://australianmuseum.net.au/truganini-1812-1876

Tuererningher

Other Names:

Pagerly



Life: Unknown -1837

Bio: Bruny Island woman and sister to a female Nuenonne clan leader known as Nelson. She was on Robinson's expedition from 1829 until 1835, before dying in 1837. Kickerterpoller was her second husband (her first was Mangana, who died in 1829).

Further Reading: http://www.utas.edu.au/telling-places-in-country/historical-context/historical-biographies/pagerly

Tunnerminnerwait

Other Names:

Peevay Jack of Cape Grim Napoleon



Life: ca 1812-1842

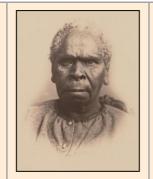
Bio: Pairelehoinner man from Cape Grim, also known as Peevay. Joined Robinson's expedition in 1830 and served until 1835. Later he was charged with killing two whalers in Victoria, and was hanged on 20 January 1842.

Further Reading: http://www.utas.edu.au/telling-places-incountry/historical-context/historical-biographies/peevay

Wapperty

Other Names:

Wobberrertee Wonoteah



Life: ca 1797-1867

Bio: A Pairrebeenne woman and daughter of Manalargenna (one of four). In the 1820s, she was abducted by John Thomas, a sealer, and taken to the Hunter Islands. She lived on Flinders Island for many years and had a child with a Maori sealer named Myetye. Many Palawa today are descendants of Wapperty.

Further Reading: Lydon (2014: 37)

Woorrady

Other Names:

Mutteellee The Doctor Count Alpha



Life: ca 1784-1842

Bio: Nuenonne man from Bruny Island who joined Robinson's party as a guide in 1829, along with this wife, Truganini. He joined the team when he was about 45 years old, and showed concern about approaching other clansmen, whom he feared would spear him. He apparently died of 'senility' at age 58.

Further Reading: http://www.utas.edu.au/telling-places-incountry/historical-context/historical-biographies/woorrady

Woretermoteteyer

Other Names:

Wattermoteer Bung Pung Margaret



Life: ca 1797-1847

Bio: Woman of the Coastal Plains Nation of the northeast coast. She was abducted by George Briggs and accompanied Straitsmen across the Indian Ocean to Africa. She spent time as a guide in Robinson's expedition in the early 1830s. Woretermoteteyer gave birth to a daughter named Dalrymple (Dolly) Johnson, and she passed away at Latrobe in 1847.

Further Reading: http://www.utas.edu.au/telling-places-in-country/historical-context/historical-biographies/woretermoteteyer-woretemoeteyenner

specifically identified in the written record. They were members of Robinson's expedition team. guides or close relations to those guides. In addition to Robinson, Palawa information was recorded by Henry Roth (1899), James Walker, Joseph Milligan (1890) and James Bonwick (1870; 1884). These men recorded features of Palawa astronomy, usually within a broader discussion of Western ideas of religion and spirit-Robinson's journals are frequently regarded as the most detailed written account of Palawa life available. During Robinson's mission from 1829 to 1834, he documented his interactions with Aboriginal people in his journals, which were later published as The Friendly Mission (Robinson and Plomley, 2008). It is within these journals that we find a majority of the references to Palawa astronomical knowledge.

One of the problems with examining colonial records is that they are translated into Western terminology by non-Aboriginal recorders, who often had a very limited understanding of the Aboriginal traditions. This was further complicated if the recorder did not have a detailed knowledge of astronomy. Misidentifications, conflat-

ed terminology and transcription errors plague colonial records of Aboriginal astronomical knowledge (e.g. Hamacher, 2012; Leaman and Hamacher, 2014). Limited information is provided about the identities of the stars in Palawa traditions, and some seem inconsistent or unlikely. In this paper, we examine the identifications proposed by other researchers, and then offer those we think best fit the information provided. This is aimed at obtaining the best picture of Palawa astronomical traditions in the most rigorous way possible. This will form the basis of future work with Palawa elders.

3 RESULTS AND ANALYSIS

Our survey revealed 42 accounts of Aboriginal astronomy tied to a physical location in Tasmania. The astronomical traditions include stars, constellations, and celestial objects (14), the Moon (5), the Sun (1), planets (2) and ancestral spirits connected to the stars (8). These are divided between Bruny Island (13), the Northwest (8), Cape Portland and Swan Island (7), Oyster Bay (5), the Northeast (5), Port Sorell (1), the Big River (1) and Ben Lomond (1).





Figure 2: "The Creation of Trowenna" (left) and "The Creation of *Parnuen* the Sun and *Vena* the Moon" (right). Paintings byTrawlwoolway artist Lisa Kennedy (http://lisakennedy.me), a descendent of Woretermoteteyer. Used with permission.

We present results on the following themes.

- (a) Cosmogony: Palawa traditions that describe the formation of the land and the creation of the first people;
- (b) Stingray in the Sky: a Palawa constellation, attempting to identify the celestial objects involved in the tradition, as their Western counterparts are not explicitly named;
- (c) Time and Astronomy: different concepts of time and the ways astronomical objects were used to denote time reckoning and seasonal change;
- (d) Lunar Traditions: Palawa views of the Moon; and
- (e) Transient Phenomena: Palawa traditions of aurorae, meteors and eclipses.

3.1 Cosmogony

In Palawa cultures, the sky, land and people are intricately linked, and the stars form the basis of Palawa cosmogony (the formation of the world). The journals of Robinson indicate that Palawa spirituality was based on 'star gods', with a good spirit ruling over the day (*Noiheener*) and an evil spirit ruling over the night (*Wrageowraper*) (Ryan, 1996: 10). The creation of the world occurred when ancestral spirits formed the land-scape, animals, vegetation and sea, which are represented in material culture (see Figure 2). Traditions from across the island differed slightly, including the pronunciation of the names and details of the story (Cotton, 1979; Cotton, 2013;

McKay, 2001; Robinson and Plomley, 2008: 406–410), but in general they were similar.

Leigh Maynard retold a Neunone story from Bruny Island about the creation of Tasmania (Thompson and Tasmanian Aboriginal Community, 2011). It is unclear if this knowledge was passed to Maynard or if he was drawing from earlier written sources. Maynard described the tradition as a circular story, like the cycles of the Moon and the Sun. Long ago, Tasmania (Trowenna) was a small sandbank in southern seas. Ice came and went and as the sea rose, the Sun flashed fire. Punywin, the Sun man, and his wife Vena, the Moon, moved from horizon to horizon together, creating life and sinking into the seas each evening. But Venna could not travel as fast as Punywin, and she fell behind. He reflected light on her to encourage her to move across the sky and catch up with him. As Venna struggled to keep up with Punywin and fell behind, he allowed her to rest on icebergs.

One day the Moon seemed to be permanently on the horizon. The day after, their first son, *Moinee*, was born. He was placed high in the sky, above *Trowenna*, as the Great South Star. The next day came their second son, gentle *Droemerdeene*. *Punywin* and *Venna* placed him in the sky between Moinee and themselves as the star Canopus.

The day after *Droemerdeene* was born, the Sun and Moon rose together again above the

sandbank that was Tasmania. They dropped seeds for the trees and plants. The next day shellfish appeared in the waters and were plentiful. *Trowenna* gradually rose from the seas and icebergs rubbed against *Trowenna*, pushing it from the great south land (mainland Australia) to the island we see today as Tasmania.

The Palawa guides on the Robinson expedition provided the first records of the creation traditions (Robinson and Plomley, 2008: 406). As in the Maynard account, the Sun and Moon were regarded as a man and woman, respectively. They gave birth to two sons: *Moinee* (the elder) and *Droemerdeenne* (the younger). They came together to create the first man, named Palawa or Parlevar (now the name given to Aboriginal Tasmanians). Moinee first created Palawa with a tail like a kangaroo and no knee joints, making it impossible for him to sit or lay down. Seeing Palawa struggle, Droemerdeenne cut off his tail, then used animal fat to rub over the wound and gave him knee joints (ibid). Droemerdeene and Moinee later got into a fight in the sky. Moinee was cast down and lived on the Earth, followed by his wife, who went into the sea, and his children who came down as rain and fell into his wife's womb (Robinson and Plomley, 2008: 409). When Moinee died, he was turned into a stone found at Cox Bight. A Toogee elder, Timler, recounts a similar tradition (Cotton, 1979).

Moinee is said to have made the first man, the rivers and the islands—attributes also given to Laller, a small ant. The interchangeability of the two creator spirits may indicate they are one and the same: a totemic relationship similar to some practiced in mainland traditions (Robinson and Plomley, 2008: 406; Witzel, 2013: 11). It may also simply reflect variations in the story across the island. The stellar identity of Moinee is not known. He was called the "... Great South Star ... [who] comes out of the sea ..." (Robinson and Plomley, 2008: 406). Plomley identifies Droemerdeenne as Canopus, the second-brightest star in the night sky. Canopus is circumpolar as seen from Tasmania and can appear to "... come out of the sea ..." as it reaches its lowest altitude (~5.5° from southern Tasmania, which is close to the extinction angle) and begins climbing back up into the sky. Droemerdeenne was placed between Moinee and their parents, the Sun and Moon. This suggests that Droemerdeene is between Moinee and the ecliptic.

The identity of *Moinee* is unclear, as the star's Western counterpart is not named and the definition of "southern" is not explicit. *Moinee* is a bright star 'in the south', presumably meaning southerly declination, and *Droemerdeene* is a bright star positioned between *Moinee* and the Sun and Moon, presumably referring to the ec-

liptic. This leaves a number of options open. If we assume that the brothers are represented by the brightest stars in the night sky, then the best fit is *Moinee* as Canopus and *Droemerdeene* as Sirius. These two stars have similar right ascensions. If we connect a straight line between Canopus, Sirius, and the ecliptic, then Sirius lies almost halfway between Canopus and the ecliptic: $\Delta\alpha$ (Canopus-Sirius) = 36°, $\Delta\alpha$ (Sirius-Ecliptic) = 39°. Other combinations are possible, such as Achernar and Fomalhaut, but these stars are not as bright.

Another clue comes from Robinson and Plomley (2008: 425). On 1 August 1831, Robinson wrote that *Droemerdeene's* brothers were two stars sitting south and east of Orion's Belt:

Tonight the Brune [Bruny Island] natives pointed out two stars to the southward, laying eastward of Orion's belt, which they said was Dromerdeenne and his brother, i.e. Beegerer and Pimerner. They were brilliant stars and appear to move towards the observer, rising as it were in the southern horizon and setting in the north.

Plomley identifies these two stars as Betelgeuse and Sirius. He suggests the text may be in error and should read "... Dromerdeene's brothers, i.e. Beegerer and Pimerner ...", instead of "... Dromerdeenne and his brother ..." (Robinson and Plomley, 2008: 500). The recorded traditions do not mention additional brothers of Moinee and Dromerdeenne. Robinson's journal indicates a single brother with two variations in name: Beegerer and Pimerner. The passage is confusing. Did he mean "... Beegerer or Pimerner ..."? Neglecting small long-term changes due to stellar proper motion, the declination of stars is constant, meaning a star rising in the southeast will set in the southwest, never the northwest. What did he mean? Were the names Beegerer and Pimerner some variation

If we assume Robinson was recording different names of a single brother of *Dromerdeenne*, (whom we identify as *Moinee*) then his description of the two stars "... laying eastward of Orion's belt ..." and rising in southward (southeast), best fits Canopus and Sirius. Orion was not visible until the early morning on the day Robinson wrote in his journal (1 August). When it did rise, Sirius and Canopus were clearly visible in the southeastern sky (the former rising at nearly the same time as Orion's Belt and the latter already 16° above the horizon). Both stars moved in a northerly direction until the Sun rose and the stars disappeared. By this time, Sirius was in the northeastern sky while Canopus remained in the southeast.

We suggest the evidence best supports the identities of the star-brothers as Canopus (Moi-

nee) and Sirius (*Dromerdeenne*). We feel it is a better fit than *Droemerdeene* as Canopus and *Moinee* as an unidentified star, but this remains uncertain. The idea that a bright star appeared in the sky but is no longer visible may hint at a possible nova or supernova, but there is currently no supporting evidence for this interpretation (Hamacher, 2014).

On a final note, Cotton (1979) recorded a story from Timler explaining that the son of Moinee was a little star named *Palana*. *Palana* mixed ashes and blood and rubbed it along the back of a thylacine pup, causing the animal's distinctive stripped feature. The Western counterpart of *Palana* is not given.

3.2 The Gemini Twins and the Origin of Fire

Traditions that describe how fire was brought to the Palawa tend to focus on the actions of two ancestor spirits who can be seen today as two stars near the Milky Way. A tradition from Oyster Bay tells how the two men stood on a mountaintop and "... threw fire, like a star ... [that] fell among the blackmen." (Milligan, 1859: 274). The two men lived in the clouds and could be seen in the night sky as the stars Castor and Pollux (the Gemini twins in Greek traditions). On 14 August 1831, Robinson discussed religion with Mannalargenna. Mannalargenna said that two men created fire and now lived in the skyworld. Mars was his foot and the Milky Way his road. According to Mannalargenna, the Cape Portland people believed fire was first made by Pormpenner. This name will be mentioned twice more in relation to fire but was spelt differently each time it was recorded: Pardedar (Robinson and Plomley, 2008: 872) and Parpedder (Robinson and Plomley, 2008: 577). On 15 August 1831, Robinson wrote that Palawa from Bruny Island said two stars in the Milky Way represented two men (Robinson and Plomley, 2008: 433). Woorrady described Parpedder as being the one who gave fire to the people of Bruny Island. Why two men were identified, but then referred to in the singular is unclear.

On 16 August 1831, Mannalargenna called the two stars *Pumpermehowlle* and *Pineterrinner*. He described them as the two spiritual ancestors who created people and fire, but the stars' Western counterparts were not named. Later, Milligan (1859: 274) recorded a story called *The Legend of the Origin of Fire* from an unknown Oyster Bay person, who identified Castor and Pollux (the Gemini twins) as the two men who created fire.¹

There is a problem with setting a planet as the body-part of a celestial ancestor. Planets constantly move relative to the stars. Was the foot of the man (men?) actually Mars, or a red star of similar brightness? During 14–16 August 1831, Castor and Pollux rose heliacally. They set before dusk, so were not visible in the evening sky. Mars was in near conjunction with Saturn (and <2° distant) at very low altitudes at dawn, with Venus and Mercury above them in the western sky. Since the stars were not in the sky when Robinson was told about them, how did he identify the foot of the man as Mars?

Castor and Pollux are northerly stars, only reaching a maximum altitude of ~16° and ~20°, respectively, as seen from Tasmania. There are no bright (first magnitude) red stars between the Gemini twins and the Milky Way. Orion is on the other side of the Milky Way and the ecliptic passes between them. Mars could appear at the "foot" of the hunters walking on the Milky Way, but this would be (relatively) sporadic. Earlier in May 1831, Mars was visible between the Gemini twins and the Milky Way. Perhaps this is the reason Mars was recorded in this way? The stellar counterparts remain unclear, but this is the only written record of the hunters' identity.

If the recorded information is from Mannalargenna, then from whom did Milligan get his information? Milligan was a doctor on Flinders Island after the Robinson expedition and would have formed relationships with the same Aboriginal people who accompanied Robinson. Mannalargenna died in 1835, nine years before. Sometime between 1843 and 1855, Milligan recorded the Legend of the Origin of Fire. Milligan did not specify the gender of the narrator. Still, a census was performed by Robinson in 1836 renaming Aboriginal people with English names (Plomley and Robinson, 1987: 878). It is probable this list contains the name of the person who gave Milligan this story. It is important to note that among this role-call were Wapperty, Calamarowenye, Truganini and Bullrer-all of whom were on the Robinson expedition and originated from the Oyster Bay region (Gough, 2014: 33). Any of the aforementioned people could have been Milligan's source.

3.3 The Coalsack and the Celestial Stingray

Robinson recorded a tradition of a stingray in the sky on 13 March 1834 at 23:00 (Robinson and Plomley, 2008: 895). The stingray was described as a black spot in the Milky Way (or Orion's Belt) that people were spearing. It was called Larder in the south (Table 2) and Larner on the east coast. Robinson used Larder in 1831 to identify the 'dark area' in the Milky Way (ibid: 497). Larner was also used in relation to Mars and Lawway Larner translates to "Milky Way/road - Stingaree" (Robinson and Plomley, 2008: 895). Larner may have been incorrectly linked with Mars, or this word may take on other meanings. Another version of the word for fish is 'Lerunna', which was recorded by Milligan (1890: 28) as "Flat Fish or Flounder".

Object **Oyster Bay Brune/Bruny Island Cape Portland** Mars LAW.WAY LAR.NER LAW.WAY DEVER.ER Star (1) PUCK.AR.NE.PEN.NER PY.LE.BAY PUM.PER.ME.HOWL.LE PINE.TER.RIN.ER Star (2) LORE.NE.PEN.NER (wife) LAW.WAY PY.ER.DREEM.ME LAR.DER Black Milky Way TONE.NER.MUCK.KEL.LEN.NER White Milky Way LAW.WAY.TEEN.NE PUL.LEN.NER

Table 2: Notes regarding star names found at the end of Robinson's journals, April–July 1831.



Figure 3: The Coalsack, bordering the Southern Cross (Crux) (Image: Wikipedia Commons).

Robinson identified the 'black spot' as being in the Milky Way or Orion's Belt. This was probably the Coalsack (Figure 3), a dark absorption nebula that could be seen clearly with the naked eye and appeared as a dark hole against the backdrop of the otherwise-bright Milky Way.

The Coalsack borders the Western constellations of Centaurus, Musca and Crux, not Orion (which is 90° away on the other side of the sky). On 13 March 1834, Orion was sitting prominently above the western horizon at 23:00 and it did not contain any large or obvious dark nebula visible to the naked eye.

Robinson's entry states that the stingray was being speared by the men. We suggest the spears may have been the Pointer Stars, α and β Centauri. 2

Cotton (2013) provides a retelling of the story of The Legend of the Origin of Fire, in which the men and their wives were identified as the stars of Crux (the Southern Cross). The original account of the story was recorded by Joseph and Isobel Cotton from Timler, an East Coast Palawa storyteller, in the 1830s, but the records were lost in a house fire in 1959 (Stephens, 2013). Years later, descendent William Jackson Cotton (1909-1981) rewrote the stories from memory and published them as Touch the Morning (Cotton, 1979). More recently, William Cotton's daughter, Jane Cooper, published William's recollected stories in Cotton (2013), but without consultation with the local Aboriginal community (Johnson et al., 2015: 14). The republished version of the story, called Cross of Fire, evokes substantial Christian imagery.

It identifies the mountain in the story, Meledna Lopatin (Mountain of Fire), as Mount Amos in eastern Tasmania (Cotton, 2013: 62). It also names the two men who bring fire as Una and Bura. Translations of the men's names are found in Roth's (1890) consolidated vocabulary. Una or Une translates to fire. The two words joined —Une Bura—is translated to 'lightning' and Bura alone is translated as 'thunder' (Roth, (1890: xiv). Una and Bura differ from the names given to these two stars in Robinson's recordings, and give a literal and direct translation to their intended meaning: fire, lightning and thunder. Similar to The Legend of the Origin of Fire, this story ends with the two men and the two women returning to the sky. However, Cross of Fire identifies the four stars as the brightest four stars in Crux (the Southern Cross), called Urapane Lopatin ('Cross of Fire') in the eastern Palawa language (Roth, 1890: xxiii, xi, respectively). In this account, the stingray joins them in the sky. This is the first account that mentions this. Conversely, the Cross of Fire story does not identify the Coalsack or any dark patches in the sky (see Cotton, 2013: 71). It is difficult to ascertain the accuracy of these records, given that they were retold from memory long after they were recorded, and they contain heavy Christian imagery.

Going back to Robinson's journals between April and July 1831, he identified a particular star, *Lorenepenner*, as being female (Table 1). The Oyster Bay word *Lorenepenner* is translated as 'wife' (Robinson and Plomley, 2008: 497). Milligan (1890: 51) identified the women as *Lowanna*, which was a common word for women in Milligan's own collected vocabulary. The presence of a female-star in Robinson's notes supports the idea that a version of *The Legend of the Origin of Fire* could have been relayed to Robinson during his mission, with the names of the stars representing the names of the ancestral protagonists featured in the story.

On 27 June 1831, Robinson wrote:

In conversation with the natives respecting the stars. These people, like the ancients, have described constellations in the heavens as resembling men and women, men fighting, animals, and limbs of men; together with names for the stars. The Aborigines pointed them out. (Robinson and Plomley, 2008: 497).

Unfortunately, like many of Robinson's entries, it is condensed and short on detail. The excerpt provides a summary of features of Aboriginal interpretations of the stars, many identifiable within Milligan (1890).

This tradition, shared by a member of the Oyster Bay group, can be unpacked beyond that of labels and language. Oral traditions are passed down for (potentially) thousands of years.

These traditions are encoded with information significant to the survival and navigation of the physical and social landscape. Reading the canopy of stars above as a form of traditional text informs practice on land, which is evident in *The Legend of the Origin of Fire.* On the surface, this tradition explains how fire came to the people of Tasmania. But this story contains information about seasonal indicators, fishing customs, burial and healing practices, as well as fire attainment.

Palawa women living on coastal environments, like Oyster Bay, spent many hours in the water. Acting as the main hunters of shellfish and being trained from a young age, they could dive considerable depths on a single breath (Robinson and Plomley, 2008: 66–88; Johnson et al., 2015: 39). Due to the significant time people spent in the sea, the oral tradition and the night sky were important for informing cultural practices regarding how to navigate their environment safely.

According to the oral tradition, two women diving for crayfish were 'sulky' due to the actions of their unfaithful husbands. Consequently, the women were speared by the stingray and died. The same wording was used in an earlier recording of a separate incident in Robinson's journals. On 4 November 1830, Robinson described the women returning from diving for crayfish off Swan Island, where they were chased by a shark (Robinson and Plomley, 2008: 302). The women were described as sulky, which made the sharks come.

The Legend of the Origin of Fire also described the women as being 'sulky' when they were speared and killed by the stingray. Afterwards, the two star men arrived and killed the stingray with their spears (Milligan, 1890: 13). This reflects culture practiced on the ground. Lloyd (1862: 52) recorded a personal observation from an Aboriginal hunting trip the morning after a significant corroboree was held during a Full Moon. He describes how up to 300 people surrounded stingrays in a semi-circle, and then the men speared them.

The final section of this tradition (Milligan, 1890: 13) explains the revival of the two women who were speared by the stingray. The dead women were placed on either side of a fire and the men placed 'blue ants' on the breasts of the women. After being bitten severely, the women came back to life. The importance of fire within Aboriginal cultures and its relationship with rejuvenation and healing is described in oral tradition. On the Wellesley Islands in the Gulf of Carpentaria, meteors signal the end of a healing process (Cawte 1974: 110). A disease called *malgri* is treated by lighting a fire next to the patient, encouraging them to heal by sweating.

Similarly, Bonwick (1870) described a Palawa patient drinking lots of cold water then lying by the fire to encourage perspiration.

The blue ant (*Diamma bicolor*) is actually a parasitic wasp found throughout southeast Australia. The female has an ant-like appearance and if disturbed, her stinger can cause burning pain and swelling. Early recordings ascribe large ants or *Diamma bicolor's* eggs as being a delicacy among the Palawa (Noetling, 1910: 281). Blue ants are active in mid to late summer, playing an important role in pollinating native plants, a possible timing component within the tradition that indicates seasonal change (ibid.).

3.4 Time, Navigation and Astronomy

Time-keeping is important for food economics, calendar development and ceremony. Consolidated vocabularies of the language groups of Tasmania (Table 3) reflect words used to indicate time of the day (e.g. sunrise, midday, sunset, twilight), astronomical presence (e.g. starlight, moonlight) and seasons (Milligan, 1890; Plomley, 1976). There are no words for the concept of time itself, a point made by Stanner (2011).

Roth (1890: 146) made a fleeting comment on the understanding of time and astronomy of Aboriginal people. He noted that they pointed out the diurnal motion of the Sun with their hands and held up two fingers to denote two days. He then claimed that "This is the only reference to any knowledge of the movement of the heavenly bodies." Conversely, Robinson wrote on 13 March 1834 that the Palawa were quite familiar with the stars and had names for

them all and were aware of their movements (Robinson and Plomley, 2008: 302). This demonstrates knowledge of the movement of heavenly bodies.

On 25 December 1830, Robinson praised the "... considerable knowledge ..." of Palawa on meteorology so much so that they had "... attained to such celebrity." As a result, Robinson and other white men would consult them on the subject and be pleased at the information they received as it was seldom wrong (Robinson and Plomley, 2008: 334). The Palawa used the stars and clouds to predict weather and determine when to fish, build huts and travel.

Astronomical knowledge is embedded in Aboriginal traditions, but is not always as obvious as a direct statement. Robinson's manuscripts describe a song from the northwest, north coast, and interior Palawa groups that was possibly used for navigation and travel. The Palawa

... repeat the words *tonener* (Sun) and point the way the Sun is travelling in her course, and point to where they are stopping for the Sun to be there. (Plomley, 1976: 51).

Tonner also referred to the 'West' (Plomley, 1976: 205) and was part of the word for the Black Milky Way, tonnermuckkellenner (Plomley, 1976: 408). The description of the actions that accompanied the repetition of tonner, indicated that this song was sung to help with timing and navigation on their journey, serving as an insight into a Tasmanian songline. We suggest that the songline describing "... the way the Sun is travelling ... [and indicating] where they are stopping ..." in relation to the Sun demonstrates a form of celestial navigation.

Table 3: Vocabulary table of Aboriginal words indicating time of day (after Plomley, 1976).						
Term	Bruny Island /Southern TAS	Oyster Bay	Northern TAS	Western TAS		
Twilight	nunto neenah	teggrymony keetana narra long - boorack				
Early morning twilight	nunawenapoyla	tuggamarannye				
Sunrise	panubre roeelapoerack	muenattemelar	warkala wetinneger			
Sunrise		puggalena parrack boorack				
Midday	toina wunna	tooggy malangta				
Midday	wer					
Sunset	punubra tongoieerah	wietytongmena				
Sunset		partopelar				
Moonlight	weetapoona	wiggetapoona		weenapooleah		
Starlight	oarattih	teahbertyacrackna				

Table 3: Vocabulary table of Aboriginal words indicating time of day (after Plomley, 1976).

Table 4: Names given to the three stars shown to Robinson on 30 June 1834

Origin	Aboriginal Word	Possible meaning
Bruny Island	PUR	White Edible Berry
Oyster Bay	PARNG.GER.LIN.NER	Wife (Eastern)
Northern	NOE.GO	West Point (place)
Western	LONE.ER.TEN	Wife

3.5 Seasonal Change and Astronomy

A group of three unidentified stars marking seasonal change are mentioned three times in the literature: twice in Robinson's journals (on 20 June 1832 and 30 June 1834) and again in interviews conducted by Ernest Westlake between 1908 and 1910. In all instances, the three stars were used to track time seasonally. In the 1832 account, the dark phases of the Moon were used in conjunction with stars to indicate specific shorter intervals of time. The Western names of these stars remain unknown.

Robinson's 30 June 1834 entry (Robinson and Plomley, 2008: 111) provides the positions and magnitudes of the mystery stars and their use as a seasonal indicator (the names are listed in Table 4):

AM, calm and clear, fine weather, Sun hot. The natives showed me the three stars which they say is a sign that the fine weather is coming and when those stars are vertical the fine weather is come. They appeared in the heavens to the eastward. No. 1 was large and is called the mother, No. 2 the husband is of lesser magnitude and No. 3 the offspring is

hardly visible. They are called by the Brune natives PUR, by the western natives LONE. ER.TEN, by the northern natives NOE.GO, and by the natives of Oyster Bay PARNG.ER. LIN.NER.

The Bruny Island word *Pur* is similar to *Purrar*, a Bruny word given to white edible berries (Plomley, 1976: 340). This association suggests that the star is white, ruling out red stars. The Western group's word *Loneerten* has connections with *Looner*, or 'wife' across many Palawalanguage groups (Plomley, 1976: 471). The Northern word *Noego* is quite close to *Nongor*, the Palawa name for West Point in northern Tasmania. *Parnggerlinner*, from Oyster Bay, may be related to the word *Parnuneninger* for 'wife' used by some eastern groups (Plomley, 1976: 321).

Key information provided from this journal which aids in identifying the stars is as follows:

- (1) The date visible was 30 June 1834 at dawn (see Figure 4);
- (2) The stars appeared eastward (azimuth between 0° and 180°); and
- (3) The stars were of different magnitudes: a large (bright) star (presumably first magnitude), a lesser bright star (presumably a second or third magnitude star), and a hardly visible star (presumably of the fifth or fainter magnitude).

The orientation of the three stars in his drawing is an illegible number. Plomley interpreted this number to be 30, presumably from looking at the sketch drawn by Robinson in Figure 5. Robinson wrote that the stars indicated fine weather was coming. When they were vertical, fine weather had come. Identifying a period of



Figure 4: Stars in the eastern sky at dawn (when the Sun is at an altitude of -10°) on 30 June 1834. Notable first magnitude stars are Sirius (right), Rigel (top), Betelgeuse (centre), and Aldebaran (left). The grid is shown in 5° increments in both declination and right ascension, where the green horizontal line is the horizon (Image: Stellarium).

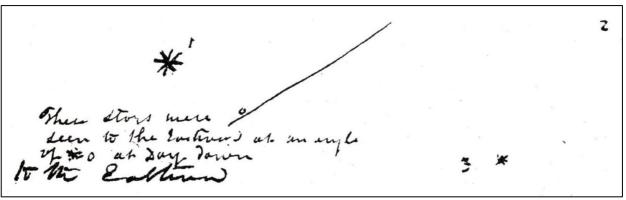


Figure 5: The sketch Robinson made showing the orientation of the three stars described on 30 June 1834.

'fine weather' in the calendar year will approximate a date to then test for stars that are vertical at this time. The clan territories that name the stars are from the North, East, West, and South of the island, indicating that 'fine weather' would (on average) be experienced across the whole of Tasmania. Meteorological data show that Tasmania experiences constant rainfall through the year, with winter having the most, and can experience multiple seasons in one day. Based on these data, 'fine weather' could be considered the 'summer months', most likely January. Since the time when climate records were first kept, January has the least rainfall.³

With these variables in mind, Plomley's identification can be tested. Plomley classified the three stars as the Pointer stars, α and β Centauri (Plomley, 1997; Robinson and Plomley, 2008: 953). On the morning of 30 June 1834 (when the Sun was 10° below the horizon; see Hamacher, 2015), the Pointers appeared in the southwest (Az = 185°–190°), not the east. The Pointers were both of similar brightness (V_{mag} = +1.33 and +0.61 for α and β , respectively) and a third barely visible star in a line with these was difficult to identify.

The Pointers are circumpolar as seen from Tasmania, so they can appear to be horizontal on some occasions in the morning and vertical in others: they are vertical (having the same azimuth) in the morning sky in mid-January and are horizontal (having the same altitude) high in the sky a month later in mid-February, or horizontal low in the sky in late July/early August.

Plomley's identification is inconsistent with the information drawn from the journal entry. Despite lining up vertically at certain times of the year, α and β Centauri encircle the South Celestial Pole. Robinson stated that the three stars lay to the east. In subsequent publications, researchers have mis-transcribed Plomley's hypothesis by claiming the stars in question are α and β Crucis (the two brightest stars in the Southern Cross), causing some confusion (e.g., see Coon, 1972: 288).

While it is difficult to accurately label the stars from the description given, there were a number of stars sitting on the eastern horizon on that morning. Many moved to a vertical position on the western horizon, on a mid-January morning. The following stars/star groups appeared prominently in the east at dawn on 30 June 1834: Pleiades (Messier 45), Sirius (α Canis Majoris), Aldebaran (α Taurii), Betelgeuse (α Orionis), Bellatrix (γ Orionis) and Orion's Belt (Mintaka, Alnilam, Alnitak).

This list identifies the most prominent stars visible at that time. Canopus is not included in this list as it sat closer to the southeast, never set below the horizon (it was circumpolar), and previously was identified as the creator ancestor Droemerdeene (although we question this identification). We attempt to identify the stars recorded by Robinson by examining a suitable list of candidates and comparing them with the information provided in the record, utilising the stars' magnitudes, relative positions, and colours (Tables 5 and 6).

Robinson's sketch does not show the stars in a linear pattern. The third star is described as being "... barely visible". Due to the faint magnitude of the third star there are multiple candidates. When grouping the three stars we take into consideration the orientation of the third star as well as the magnitude; only picking stars that were fifth magnitude or brighter.

Groups 3 and 7 are the only ones that meet all of the criteria. The Group 3 stars (Figure 6) fit the description reasonably well. Of the three stars, Sirius the brightest star in the sky, sat eastward at dawn. Its orientation with Adhara and Wezen was similar to the sketch drawn by Robinson (Figure 5). Sirius, the most northerly of these stars, exceeded an altitude of 5° (the extinction angle) when the Sun was at -10° altitude on 15 June 1832. This is considered the first day the three stars of Group 3 were unambiguously visible in the east at dawn. The relative brightnesses are roughly consistent, although Wezen, with a V_{mag} of 1.2, is not "hardly visible". But when the stellartrio were very low on

Table 5: Seven possible groupings of three stars as recorded by Robinson. The groupings of three stars noting their visual magnitudes (V_{mag}), general spectral type (colour), and the star's coordinates (right ascension and declination in J2000).

Common Name	Bayer Designation	Vmag	ST (Colour)	RA (J2000)	DEC (J2000)
Rigil Kent	α Centauri	0.01	G (Yellow/White)	14 ^h 39 ^m 36.5 ^s	-60° 50′ 02.4″
Hadar	β Centauri	0.61	B (Blue)	14 ^h 03 ^m 49.4 ^s	-60° 22′ 22.9″
Hip 70264 A	n/a	4.90	K (Orange)	14 ^h 22 ^m 38.02 ^s	–58° 27′ 36.7″
Mintaka	δ Orionis	2.23	O/B (Blue)	05 ^h 32 ^m 00.4 ^s	−00° 17′ 56.7″
Alnitak	ζ Orionis	1.77	O/B (Blue)	05 ^h 40 ^m 45.5 ^s	-01° 56′ 33.3″
Alnilam	ε Orionis	1.69	B (Blue)	05 ^h 36 ^m 12.8 ^s	-01° 12′ 06.9″
Sirius	α Canis Majoris	-1.46	A (Blue/White)	06 ^h 45 ^m 08.9 ^s	−16° 42′ 58.0″
Adhara	ε Canis Majoris	1.50	B (Blue)	06 ^h 58 ^m 37.6 ^s	–28° 58′ 19.0″
Wezen	δ Canis Majoris	1.82	F (White)	07 ^h 08 ^m 23.5 ^s	−26° 23′ 35.5″
Aldebaran	α Tauri	0.87	K (Orange)	04 ^h 35 ^m 55.2 ^s	+16° 30′ 33.5″
Bellatrix	γ Orionis	1.64	B (Blue)	05 ^h 25 ^m 07.9 ^s	+06° 20′ 58.9″
Meissa	λ Orionis	3.50	B (Blue)	05 ^h 35 ^m 08.29 ^s	+09° 56′ 03.0″'
Betelgeuse	α Orionis	0.42	M (Red)	05 ^h 55 ^m 10.3 ^s	+07° 24′ 25.4″
Mirzane	β Canis Majoris	1.99	B (Blue)	06 ^h 22 ^m 42.0 ^s	−17° 57′ 21.3‴
Beta Monocerotis	β Monocerotis	4.60	B (Blue)	06 ^h 28 ^m 49.16 ^s	−7° 01′ 58.2‴
Rigel	β Orionis	0.12	B (Blue)	05 ^h 14 ^m 32.26 ^s	−8° 12′ 06.0″
Mirzam	β Canis Majoris	1.99	B (Blue)	06 ^h 22 ^m 42.0 ^s	−17° 57′ 21.3″
Saiph	κ Orionis	2.09	B (Blue)	05 ^h 47 ^m 45.4 ^s	-09° 40′ 10.6″
Bellatrix	γ Orionis	1.64	B (Blue)	05 ^h 25 ^m 07.9 ^s	+06° 20′ 58.9″
Saiph	κ Orionis	2.09	B (Blue)	05 ^h 47 ^m 45.4 ^s	-09° 40′ 10.6″
Gamma Monocerotis	γ Monocerotis	3.95	A (White)	06 ^h 14 ^m 51.10 ^s	-06° 16′ 26.0″

Table 6: Possible groupings of three stars using the description recorded by Robinson. The groupings are tested to see if they match the criteria using Robinson's recorded descriptions.

Star Groupings	Non-Red Stars	Eastward	Dawn	Sketch and Magnitude	Vertical in mid-January
Group 1	~		~		~
Group 2	>	>	~		~
Group 3	~	~	~	'	~
Group 4		~	~		~
Group 5		~	~	·	~
Group 6	v	V	~		'
Group 7	V	V	~	'	'

the horizon at dawn, the background light was enough to sufficiently obscure it and make it appear much fainter.

Group 7, while meeting all of the criteria, seems less likely as they straddled Orion's Belt. Orion's Belt was mentioned by Robinson in ear-

lier entries, indicating that he knew the asterism and was likely to have labeled or located them when describing the three stars. There is one problem: if Plomley is correct in identifying Betelgeuse and Sirius as *Dromerdeene's* brothers, would he not recognise Sirius—the brightest star



Figure 6: A trio of bright stars in Canis Major—Sirius, Adhara, and Wezen (Group 3)—are the best fit for the three stars described and illustrated in Robinson's journals. Sirius has an azimuth of 107.5° at an altitude of 5° at dawn (when all three stars are first visible together above the horizon) on 15 June 1832 (shown) (Image: Stellarium).

in the sky—and realise that it was already identified in Palawa traditions?

An altercation between the Tarkiner group of Northwest Tasmania and the Robinson party occurred, and a fight was scheduled to take place at Nongor (West Point). The two entries below were made by Robinson regarding the timing of this fight (Robinson and Plomley, 2008: 652):

19 June 1832: I learnt that the TARKINER natives were to come and fight them when the rest came back from Robbins Island – the TARKINER would come two dark nights after the Moon was gone (it was now moonlight).

20 June 1832: Learnt that the greater part of the natives had gone to Robbins Island and were engaged in getting spears, that they would return again when two darks or when the three stars come.

The New Moon (denoting the days where less than 3% of the Moon facing the Earth is illuminated) occurred from 26 to 28 June 1832. The fight with the Tarkiner was scheduled for 29 June 1832—two nights after the 'disappearance' of the Moon. This allowed the combatants nine days to prepare. Additionally, the appearance of the stars may have signified the time of day, not the day of the month. This may have been indicated by two dark nights (date) and "... when the three stars come" (time), translating to Friday 29 June 1832 at approximately 05:45.

The reference to "... when the three stars come ..." seems to refer to the three stars we are trying to identify in this section. Coincidently, Robinson was shown the three stars that in-

dicated seasonal change exactly two years later, on 30 June 1834, suggesting the same three stars were described in both accounts. The earlier mention of the three stars in 1832 indicates that they had yet to appear in the sky.

In an interview with Ernest Westlake, noted under the heading 'Springtime', Augustus Smith (Fanny Cochrane Smith's grandson) spoke of three stars (Plomley et al., 1991: 63):

Three little stars in the east on a level only once in a year. Thought a lot of them, just to see them blinking. FS thought it a terrible thing if didn't welcome these three little stars. Would sprinkle the ashes from the hearth very early in the morning before the Sun had risen, when the stars are bright.

Like the two previous entries in Robinson's journals, Smith described the three stars to the east in the early morning 'on a level', and associated them with seasonal change (springtime). The three stars of Orion's Belt (Alnitak, Alnilam, and Mintaka) are seen in the early morning sky rising 'on a level' during the winter months of June, July, and August (Figure 7). The stars of Orion's Belt rise heliacally (at dawn) around 8 June each year, and heliacally set (at dusk) around 19 July. The heliacal rise appears to be premature for a welcoming of Spring, yet the Orion asterism is visible in the sky, just as described in the three literature entries.

The earliest recording of three stars in June 1832 gives timing components (dates, two dark nights, indication of moonlight) to cross check. The emergence of the three stars of Orion's Belt is in line with the description. Orion's Belt ap-





Figure 7: The stars of Orion's Belt rising in the East (right) and setting in the West (left) as seen from Tasmania in the 1830s. The belt stars are 'level' as the rise, and perpendicular to the horizon as they set (Image: Stellarium, but 'without atmosphere' for clearer visibility for the reader).

peared above the horizon early in the morning from 05:30, before setting with the Sun at 07:00. Two years later, nearly to the day, Robinson wrote about three stars again. Accompanying the entry is the sketch placing the stars as 'eastward' at 'day dawn'. The three stars of Orion's Belt were clearly visible on the horizon in the east at that time. The repetition of the position of the three stars at the similar time of year supports the idea that the three stars of Orion's Belt could be the stars recorded in the iournal. The constellation of Orion is visible above the horizon during summer nights, supporting the idea that the first appearance of these stars would have been welcomed after a cold Tasmanian winter. This is uncertain, but will be the topic of future ethnographic work.

3.6 Lunar Traditions

As noted in Cotton's (1979; 2013) recording of Toogee elder Timler's tradition, the Sun and Moon are parents of the creation ancestors that became the first stars. Similar traditions exist across Tasmania. The Palawa of Bruny Island told Robinson how the Moon-woman, *Vetea*, got her dark patches (the maria on the Moon):

The Brune natives affirm that the Moon (VETEA) came from England and that she stopped at the RORE.DAIR.RE.ME.LOW, that is, the country at Oyster Bay, that the kangaroo and mutton fish asked the Moon to stop there, that the Moon was LOONER, woman, that she was roasting mutton-fish when the Sun (PARNUEN) came and swept her away, and she tumbling into the fire was hurt on her side and then rolled into the sea, and afterwards went up into the sky (WARRANGERLY) and stopped there with her husband the Sun. They say the rainbow is the Sun's children. [Woorady] Told me if I looked I would see it black where she had been burnt. (Robinson, 1831: 412).

The Adnyamatana of the Flinders Ranges in South Australia have a tradition in a similar vein. *Vira*, the Moon-man falls off his stick ladder while trying to punish his nephew for stealing his food (Tunbridge, 1988: 68–69). On impact he

bursts open, leaving marks on his belly.

The Moon was used by Palawa to tell the time (Robinson and Plomley, 2008: 652) and count (Robinson and Plomley, 2008: 267). The appearance of the Moon could also signal a change in the weather (Robinson and Plomley, 2008: 334):

... if a circle [halo] is round the Moon it's a sure sign of bad weather. Indeed, they have numerous signs by which they judge and I have seldom found them to err. Thus they are enabled to know when to build their huts, to go to the coast for fish, travel etc. They also judge by the stars and have names by which they distinguish them.

In the weather folklore of cultures around the world, lunar haloes have long been used to predict bad weather (e.g. Guiley, 1991: 22). The halo itself is caused by moonlight being refracted by ice crystals in the atmosphere. These crystals form in cirrus clouds, which often come before a low pressure system, of which rain is a frequent result.

These traditions emulate a constant theme of disruption and restoration that is common in lunar traditions. We argue that the Moon was a symbolic cycle of pain and healing that was reflected on the bodies of Palawa. Scarring was first thought to be unique to each group, as a distinguishing feature between nations. Yet often when there was mention of cicatrices, Robinson offered an astronomical motif in partnership, indicating meaning beyond the cosmetic (Johnson et al., 2015: 35). Sightings of Moonor crescent-shaped markings on Palawa bodies appeared, but were not limited to the east coast of Tasmania. When they landed on the east coast of Tasmania, Lieutenant Le Paz, a member of French explorer Marc-Joseph Marion Dufresne's expedition in 1772, noticed "... several little scars or black marks in a crescent shape ..." on the chest of a young man (Duyker, 1955:

On 1 November 1830, Robinson observed

most of the people from the eastern groups "... had the form of the Moon cut on their flesh." (Robinson and Plomley, 2008: 297). In a note written on the end pages of his journal, Robinson carried on this thought and wrote (ibid.: 613):

... the Aboriginal females on the islands have round circles cut in their flesh in imitation of the Sun or the Moon. I have seen a woman with four of them on her body; others I have seen with two or three. They are very fond of them, are generally placed on each side of the backbone and about the hips ... The cicatrices of the Sun and Moon is intended to remove inflammation and having the power of those luminaries they imagine it will have the same influence on the part infected.

Similar circular images were reproduced in rock engravings, drawings, huts, stone arrangements (Bonwick, 1870: 192), and on bodies, often involving more than one meaning. Robinson wrote of a surveyor, Mr Hellyer, seeing a circular charcoal drawing and believing it was a representation of the Sun. Robinson corrected him in his journal stating: "Those circles are emblematical devises of men and women ..." (ibid.: 575). In regard to this entry, Plomley addresses the conflicting meanings without mentioning the possibility of the circle being a polysemous symbol. The Moon was previously identified as a woman named Vetea, indicating a circle can mean both woman and Moon. The multi-layered meanings of man, woman, Moon, and Sun are interchangeable and complex. The power of each is not confined to a singularity, but rather an Indigenous view of well-being, traversing body, environment, and spirit in an ebb and flow of meaning and balance.

Robinson identified women specifically in the above passage, noting their cicatrices were localised around the hips and on either side of the spine. These areas on a woman's body are affected by strain during childbirth and menstruation. The waxing and waning Moon is often linked to the cyclic flow of menstruation (Berndt and Berndt, 1993). The Moon is recorded as both male and female across Aboriginal communities in Australia (usually male), and is often related to fertility, no matter the gender. The Moon man in some traditions, if looked at directly, can impregnate young women (Haynes, 1997: 107) or oppositely render the onlooker barren (Bates, 1972).

In Tasmania, the placement of these cicatrices could have been used as a healing agent in response to back pain and curing issues around fertility. Women were assigned much of the labour, including hunting crayfish and seals, climbing trees for possum, mining ochre, and on Robinson's journeys carrying the bulk of the load while travelling. The men hunted larger

game and act as guards for the group (Johnson et al., 2015; Robinson and Plomley, 2008).

Finally, the origin story recounted by Leigh Maynard (Thompson and Tasmanian Aboriginal Community, 2011) in Section 3.1 described the phases of the Moon. In the beginning, the Sun and Moon rose together (New Moon). As each day passed, the Moon woman fell behind the Sun man in their journey across the sky. He encouraged her by lighting more of her up each day, which explained the waxing Moon. Eventually she was on the opposite side of the sky to the Sun (Full Moon). This is one of the rare accounts that explicitly acknowledges that the light of the Moon is a reflection of the Sun's light (a point noted by R.S. Fuller, pers. comm., 2016).

3.7 Transient Phenomena

Transient phenomena, such as meteors, comets, eclipses and aurorae, are featured prominently in Aboriginal traditions across Australia (Hamacher, 2012). Palawa from across Tasmania also have traditions of these phenomena, which are discussed in this section.

3.7.1 Meteors

There are few records of how Palawa perceived or understood meteors in their traditions. In southern Tasmania, a meteor was called *Pachareah* (Milligan, 1866: 426) and Coon (1972: 288) mentions that a falling meteorite one night startled some Palawa, who shrieked and hid their heads.

In Plangermairrener traditions (Noonuccal, 1990: 115–119), a cheeky woman named *Puggareetya* tormented and fought a snake. Their wrestling upheaved the ground, forming the hills and mountains of the landscape. The snake cast the woman into the sky and is held there by the sky spirit *Mienteina*. *Puggareetya* continues to play tricks on the sky deities, who occasionally grow frustrated with her antics and throw her across the sky. She is then seen as a meteor (Hamacher and Norris, 2010).

As discussed in Section 3.1, the star-spirits, *Moinee* and *Droemerdeenne*, battled and *Moinee* fell to Earth at Cox Bight, where he can be seen today as a large standing stone (Coon 1972: 288). It is assumed *Moinee* took the symbolic form of a meteor ('falling star'), but this is inferred, never stated.

3.7.2 Aurorae

Cultural traditions of the *Aurora Borealis* (northern lights), which are commonly visible to cultures at high latitudes, tend to be associated with positive omens (Hamacher, 2013). Where aurorae are less common, such as those in the Southern Hemisphere, traditions err towards

caution and act as warning. The positioning of Australia on the northern edge of the southern auroral zone means that the *Aurora Australis* was rarely seen, compared to areas within the peak of the auroral zones. Aurorae in Aboriginal traditions are often associated with blood, fire and death because of its sometimes reddish appearance (ibid.).

The Aurora Australis is well known to the Palawa, as Tasmania lies at the northern edge of the southern auroral zone. There are a few different Palawa names of aurorae, as noted in Robinson's journals. On 19 October 1837, Robinson recorded two names from Rolepa, a leader of the Ben Lomond group, as Nohoiner and Purnenyer, and two names from the Western Palawa: Genner and Nummergen.

Nohoiner is nearly identical to the Cape Portland name Noiheener, attributed to an 'electric spark' recorded in an entry by Robinson six years earlier. The Ben Lomond Palawa were thought to be linked in trade agreements with the Cape Portland Palawa. It is possible that they shared language and it is possible that the two words meant the same thing with respect to random light phenomena (Ryan, 2012: 32).

The earlier use of the Cape Portland word *Noiheener* was recorded by Robinson on 12 August 1832 and parallels the sentiments of mainland Aboriginal Australia's feelings of apprehension when an aurora was visible (Robinson and Plomley, 2008: 430):

The natives last night saw an electric spark in the atmosphere, at which they appeared frightened, and one of them told them not to mention it as they would all be sick if they did – the native of Cape Portland call in NOI.HEE.NER and the Port Sorell natives call it NAR.NO.BUN.NER.

It is unclear if the 'electric spark' was referring to an aurora. Similar words with slightly different spelling variations are applied to various forms of light phenomena, including aurorae, lightning and thunder. Nowhummer was a word used by Aboriginal people from West Point and Cape Grim in Tasmania's Northwest for an evil spirit (Plomley, 2008: 650). People from Bruny Island are also recorded as believing thunder and lightning is an evil spirit (Plomley, 2008: 321). In Plomley's consolidated word list, Noiheenner is a name given by various language groups to represent 'God', good spirit, Sun, Moon, thunder, and lightning. These words may first appear to be different yet they all share attributes of ancestral beings. Robinson, being a religious man, may have translated meanings of thunder and lightning as God or spirits, all of which were taught to be respected and feared.

Records of auroral traditions in Tasmanian languages provide insight into how Palawa paid

close attention to properties of natural phenomena. According to Anonymous (1877):

There was a splendid Aurora in 1847, grand in its-effects at Hobart Town; and an interim one September 4, 1851, at the same place where the vividly shooting streamers of violet, red and other colors, where somewhat marred by the bright moonlight. The Aborigines of Tasmania compared the crackling noise of the curruscation to the snapping of their fingers.

Despite reports of sound associated with aurora, it was not believed an aurora could produce these sounds, as it was too far away. In 2012 researchers from Finland found a direct link between noise and aurorae, and that the auroral sounds actually were generated close to the ground (Laine, 2012).

3.7.3 Eclipses

There are no confirmed accounts of solar eclipses in recorded Palawa traditions, but there is a record of a lunar eclipse. During the Robinson expedition from 1829 to 1834, 11 lunar eclipses were visible from Tasmania, including two total eclipses (both in 1830). ² But only one was mentioned in any of Robinson's journals and none was identified from the remaining literary sources.

On 24 August 1831, Robinson wrote that two days earlier, Manalargenna, Kickerterpoller, and three women left to make contact with other people in the area. They were away from Robinson's party for five days, and during their absence the guides with Robinson noticed the Moon move into the Earth's shadow. They took this as an ominous sign that harm had come to Kickerterpoller and he had ascended to the Moon. Truganini and Woorrady saw the lunar eclipse from Waterhouse point and read it as a bad sign that Robinson had been speared (Cameron, 2015). We identify this as a reference to a partial lunar eclipse visible on 23 August 1831 that reached mid-eclipse at 22:00. The perception of the eclipse by Truganini, Woorrady, and Robinson's guides is more or less consistent with other Aboriginal views of eclipses from across Australia (Hamacher and Norris, 2011).

4 SUMMARY AND CONCLUSION

This paper explores the fragments of Palawa astronomy recorded in the literature dating back to the early nineteenth century, from which we attempt a partial reconstruction. While variations of knowledge in some cases are evident, there is continuity with many of the traditions, including those relating to the Sun, Moon, the creation brothers, the stingray in the sky, calendars, time keeping, and views of transient phenomena. This suggests that Palawa used the Sun for navigation and developing songlines.

Mainland Aboriginal traditions share fundamental similarities with those of Aboriginal Tasmanians. Locality affects individual groups' astronomical traditions across Australia, as the adaptive nature of the traditions reflects the natural world in which the community lives. Astronomical objects commonly associated with Aboriginal traditions on the mainland of Australia are the Milky Way, Orion, the Pleiades, the Magellanic Clouds, dark nebula (e.g. the Coalsack), the Sun, and the Moon. represented in recorded Tasmanian traditions except for the Pleiades and the Magellanic Clouds. The absence of these objects is pecu-They are incorporated into traditions of nearly all Aboriginal groups across Australia. Johnson (2011: 295) believes it is unlikely there were no Tasmanian traditions about the Pleiades, but for some reason they simply were never recorded.

This paper is a preliminary study into how Palawa constructed and utilised the connection between the landscape and skyscape. This included the diurnal motion of the Sun and its application to navigation, how the movements of the stars were used to denote seasonal change and timekeeping, and how transient astronomical phenomena were associated with death or bad omens. The Moon's importance as a symbol of restoration and healing may have had symbolic representation on cicatrising marks found on people's bodies and explained through oral traditions.

This research shows how the night sky is a blackboard on which traditions are drawn with stars, and retold to educate generations about moral code and law. But it is also only a rudimentary starting point for future research.

5 NOTES

- In Boorong traditions of western Victoria (Stanbridge, 1858: 140), Castor (Yuree) and Pollux (Wanjel) represented two young male hunters who pursued a kangaroo and killed him at the commencement of the 'great heat' (summer).
- 2. In this context it is interesting that in northwestern Victoria the Coalsack was an emu named *Tchingal* in the Wergaia language. The eastern stars of the Southern Cross (α and β Crucis) were the pointy ends of the spears of two warriors who speared the emu through the neck and rump (Stanbridge, 1858: 139).
- https://en.wikipedia.org/wiki/Climate_of_Tas mania
- Javascript Lunar Eclipse Explorer, NASA. Eclipse predictions by Fred Espenak and Chris O'Byrne. http://eclipse.gsfc.nasa.gov/ JLEX/JLEX-index.html

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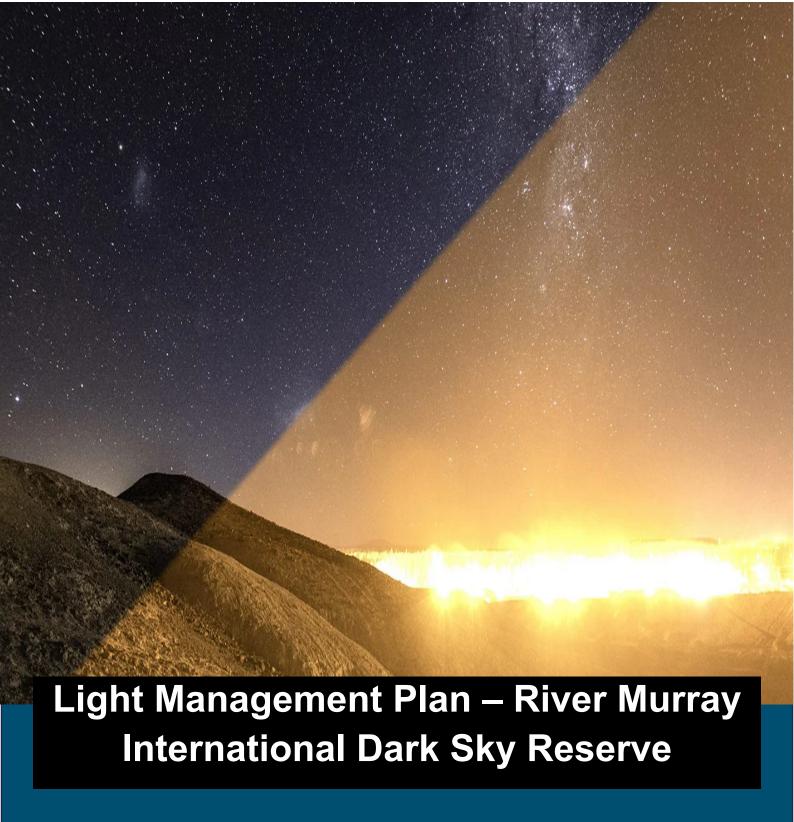
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August 2025

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Acknowledgement of Country

Mid Murray Council would like to acknowledge and pay respect to the Traditional Custodians of the land: the Ngadjuri, Ngaiawang, Ngangaruku, Ngarkat, Ngarrindjeri and Peramangk Peoples of the Mid Murray lands and waters.

It is upon their ancestral lands and waters that the Mid Murray Council operates, and Council pays respect to Elders, past and present, and their spiritual beliefs that are of continuing importance to those First Nations Peoples of today.

Council further acknowledges the contributions and important role that First Nations Peoples continue to play within the community



Introduction

This Light Management Plan has been developed to ensure that the River Murray International Dark Sky Reserve (the RMIDSR) satisfies the criteria set by DarkSky International and should be read in conjunction with the Dark Sky Policy adopted by the Mid Murray Council. The Plan is required to ensure that the already naturally dark sky in this region is not only protected, but also further enhanced, through various measures, including lighting education programs, a reduction in the number of lights and modifications to existing outdoor light fittings and globes.

Aims

The aims of this Light Management Plan are:

- To raise community awareness of the RMIDSR and seek their assistance in maintaining the Dark Sky.
- To ensure that Council, other Government bodies and private landholders within the RMIDSR understand how they can assist in preserving, enhancing and promoting the Dark Sky Reserve concept.
- 3) To ensure all new public lighting meets International Dark Sky Standards.
- 4) To retrofit existing outdoor public lighting to meet DarkSky International standards.

This Light Management Plan conforms to all local, regional and national legislation. It provides additional policy not mentioned in the following legislation:

- 1) Planning, Development and Infrastructure Act 2016.
- 2) Planning and Design Code.
- Australian Standards for public lighting AS 4282 (Control of the obtrusive effects of outdoor lighting), AS 1158 (Lighting for roads and public spaces) and AS 2560 (Sports lighting).



Where this document applies

This document applies to the geographical area to be known as the 'River Murray International Dark Sky Reserve'. As shown in Figure 1, this area spans between the eastern and western borders of the Mid Murray Council area and includes the southern portion of the Council area (excluding Mannum). The northern boundary of the reserve includes the township of Blanchetown.

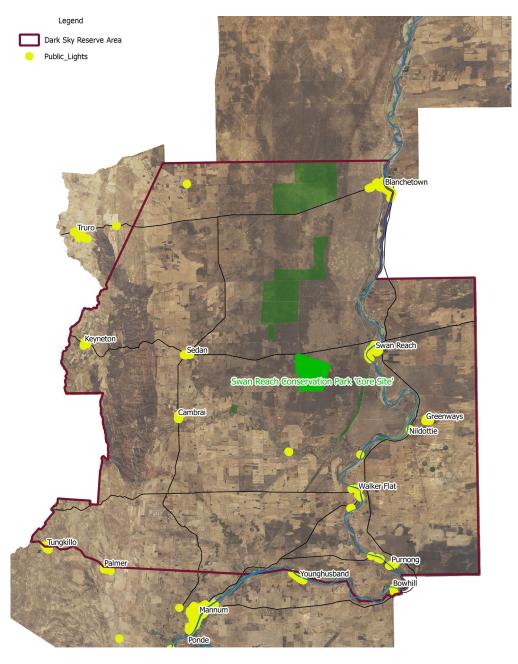


Figure 1 River Murray International Dark Sky Reserve

Why a Dark Sky?

Light pollution has a detrimental effect on the ability to view the night sky and poses a threat to the native fauna and flora. Excess lighting impacts on nocturnal animals and unnecessarily wastes energy.

A dark sky showcases the natural night sky and allows it to be enjoyed by residents, visitors and future generations. It enables community benefit through economic growth from sustainable and eco-friendly tourism. It ensures protection for a natural asset in a dark sky location which is increasingly difficult to protect around the world.

The RMIDSR aims to preserve, protect and enhance the night sky of the Mid Murray region.

What is good lighting?

Outdoor lighting used in public, commercial, or industrial settings is generally intended to ensure a secure and functional environment. Additionally, it can serve purposes such as enhancing human comfort or supporting business activities. On the other hand, preserving dark areas, managing artificial light during certain seasons, or reducing skyglow may be essential for safeguarding wildlife, supporting astronomical observations, or promoting dark sky tourism.

Good lighting directs light where it is needed, does not cause glare and is only needed for its intended use. Good lighting does not shine above a horizontal plane and is appropriately contained so that it does not cause nuisance to neighbours.

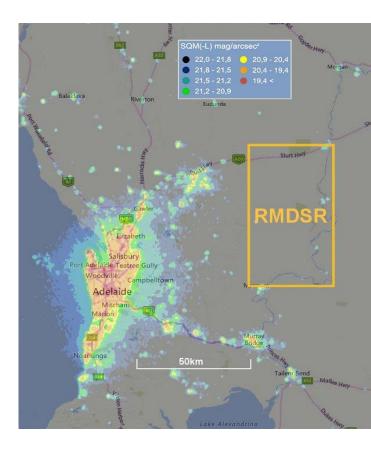


Best practice lighting design

Natural darkness has conservation value in the same way as clean water, air and soil and should be protected through good-quality lighting design.

The following simple management principles can be used to reduce light pollution:

- 1) Start with natural darkness and only add light for specific purposes.
- Use smart technology, adaptive light controls to manage light timing, intensity and colour.
- Light only the object or area intended keep lights close to the ground, directed, and shielded to avoid light spill.
- 4) Use the lowest intensity lighting appropriate for the task.
- 5) Use non-reflective, dark-coloured surfaces.
- 6) Use lights with reduced or filtered blue, violet and ultraviolet wavelengths.



Existing lighting in the Dark Sky Reserve

There is a wide variety of existing outdoor lighting within the RMIDSR. A positive aspect of the location of this Reserve is that it is in an area which is not subject to large development pressures, and therefore it is unlikely any new substantial arrays of lighting will be developed in this area in the coming years.

Conservation Parks

There are five conservation parks within the Dark Sky Reserve area; Swan Reach Conservation Park, Marne Valley Conservation Park, Ridley Conservation Park, Brookfield Conservation Park and Ngaut Nguat Conservation Park. The Swan Reach Conservation Park is the core site of the reserve. Development is restricted in these sites for conservation purposes. There is no current outdoor lighting in the conservation parks.

Ferries

There are three ferries which operate within the Reserve area 24 hours a day. Ferries operate at Walker Flat, Purnong and Swan Reach. Due to safety requirements, the lighting on these ferries is required to be bright. With the aim of the lights being retrofitted to meet the DarkSky International Standards for outdoor lighting within ten (10) years of Dark Sky Accreditation.

Shack Areas and Townships

Street lights are located within some shack areas and townships in the Dark Sky Reserve. All street lighting in these areas will be retrofitted to meet the DarkSky International Standards for outdoor lighting within ten (10) years of Dark Sky Accreditation. Current LED rollout by SAPN to 3000K covering the Council area will be completed by July 2025.

Commercial Properties

As the area contains some commercial operations, some level of commercial lighting will be required to be maintained, however Mid Murray Council and the Mid Murray Landcare SA Inc. will work with owners of commercial premises to ensure outdoor lighting and illuminated advertising signage meet the International Dark Sky Standards. As a principle, digital signage is preferred option to meet light pollution guidelines and prevent unnecessary light spill.

Rural Areas

The Mid Murray Council has many rural farming properties. These areas are generally free of streetlights and outdoor lighting.



Management of Lights

Given the vast expanse of the proposed RMIDSR, and the complex land tenure arrangements (many hundreds of privately owned parcels of land), it is proposed that this matter be approached from a community education perspective, with all private landowners being encouraged to upgrade existing external lights to be compliant with the DarkSky International Standards.

Demonstration Site - Cambrai

To raise awareness of the reserve and educate the Mid Murray community about good lighting, the Main Street of Cambrai has been identified as a demonstration site which will display different types of lighting which are deemed to be compliant. With a population of under 300, Cambrai is home to Council offices, a general store, a hotel and local services including a school and swimming pool. Cambrai is a central destination in the Reserve.

Cambrai offers the opportunity to showcase smart technology options for the control of artificial light at night through smart dimming technology and pedestrian and traffic throughput measurement.

Statutory Requirements

The Mid Murray Council has a statutory role regarding new development in accordance with the *Planning, Development and Infrastructure Act 2016*, the Building Code of Australia and the Planning and Design Code. The Mid Murray Council will liaise with the State Planning Commission to integrate lighting policy in the Planning and Design Code.

The Department of Climate Change, Energy, the Environment and Water – National Light Pollution Guidelines for Wildlife (May 2023) also include provisions for managing light pollution. For example:

Lighting Design: These could be expanded to mandate the integration of smart technology, requiring developers to demonstrate the use of adaptive lighting controls and compatibility with ongoing monitoring systems.

Lighting Objectives: Guidelines could incorporate Al-driven predictive models to simulate light spread during the planning phase, helping to proactively reduce ecological impacts, astronomy or dark sky tourism.

Lighting Standards and Guidelines in the River Murray International Dark Sky Reserve

Installation of all outdoor public lighting on Council owned land and public street lighting shall be 'Dark Sky friendly'. Outdoor lighting needs to meet the following criteria to be considered 'Dark Sky friendly'.

- Lights with greater than 500 lumens must be fully shielded to prevent any light being emitted at or above the horizontal plane.
- Be fitted with smart technology control systems, motion sensors or timers where possible to enable switching or dimming.
- Have a coordinated colour temperature (CCT) less than 3000K.
- Be switched off when not needed.
- Not emit light on white or other reflective surfaces.

The following principles are adopted for all outdoor lighting within the Reserve:

Principle 1: Start with darkness and only use light when needed

Before installing or replacing a light, determine a clear purpose for that light. Start from the perspective of darkness and install outdoor public lighting, only when deemed necessary. This lighting should only be activated when needed.

Before installing or replacing a light, consider the purpose of the light by deciding:

- When the light is used?
- How the use of light will affect the surrounding area?
- Where the light should be directed?

Motion sensors and timers should be installed, where practical, to ensure that outdoor lighting is only used when needed. If there are no motion sensors and timers installed, lights should be switched off when not in use.

The use of smart technology for the control and dimming of lighting should be considered where possible and included to enhance the function of motion sensors and timers.

Principle 2: Use energy efficient globes

Lighting should be energy efficient to reduce carbon footprint. Lighting should have a maximum correlated colour temperature (CCT) limit of 3000K to be considered 'dark sky friendly'. It is recommended that the CCT value does not exceed 2700K. 'Warm' lighting has a lower CCT value, causes fewer disturbances to wildlife and reduces sky glow.

Principle 3: Avoid light spill

All outdoor lighting should be directed downwards so that spill light is avoided. Spill light is light that falls outside the area that is intended to be lit. Spill light from internal and external lighting of a development can cause glare, light trespass and wastes energy.

Light which is directed above the horizontal plane creates artificial sky glow and does not serve a useful purpose to the community. Light should be directed downwards and in any case less than a horizontal pane, preferably up to 30 degrees below the horizontal.

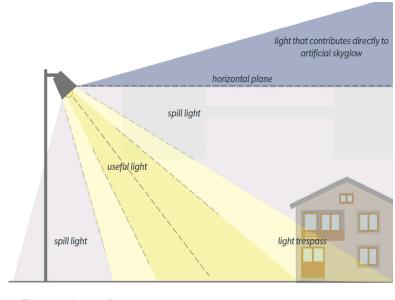


Figure 2 Light spill

Lighting used for night operations and industry should be directed downwards, be a warm light and be shielded.

Light spill can be avoided by:

 Installing light fittings with an opaque cover and flat glass, mounted horizontally on both axes;

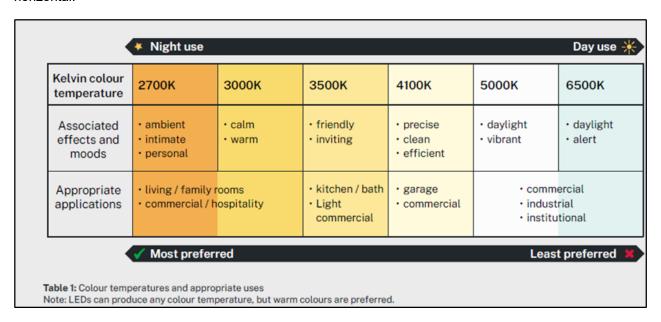


Figure 3 Colour Temperature

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- Mounting the light under part of a building, verandah or roof so light is blocked from shining above the horizontal plane;
- Designing buildings to internalise light and prevent it from escaping into the night sky;
- Using a blind or shutter to prevent light escaping from skylights and solar tubes.

Principle 4: Shield lights

Shielded lights do not allow any light above the horizontal plane. Non-shielded light bulbs expose light to shine in all directions and should be avoided. Fittings which shield light so that it is directed downwards is preferred. Figures 4, 5 and 6 show appropriate shielding of light.



(a) Non-shielded outside light fitting

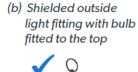






Figure 6 Exposed bulb that allows light to shine in all directions and a fitting designed to minimise light spill by only allowing downward projection of light

Figure 4 Shielding of light



Figure 5 Floodlights fitted with different shielding design

Table 1: Intensity of lighting for various activities

Activity type	Lumens emitted
Dwelling	1800-7200
Single porch light	900
Tennis court (domestic)	100 000
Farm building	1800-7200
Single security light	900-4000
Swimming pool	1200
Public open space/small car park	1200
Small sports oval (single field)	1 000 000
Road lighting	Refer to AS/NZS 1158
Rural Industries	<1 000 000
Stockyards (commercial)	<1 000 000
Mining and extractive industries	>5 000 000
Advertising signage (externally lit)	1800-7200
Small motel or commercial building	12 000
Recreational, decorative, promotional and special events lighting	No greater than necessary.

Principle 5: Avoid over lighting

Lighting should be installed to be appropriate for the activity taking place. The amount of light produced (lumen) is the most important consideration to ensure an area is not over lit.

The intensity of outdoor lighting should be appropriate for its intended use. Unshielded lights should be limited to 500 lumens.

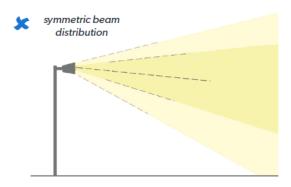
Principle 6: Use asymmetric beams for floodlighting

Floodlights are required for sporting facilities and commercial stock yards. Where floodlights are proposed, the light fittings with asymmetric beams should be used. The fittings should direct light down toward the surface being lit to prevent light spill, as shown in Figure 7.

Flat glass fittings should be installed with the glass horizontal to make efficient use of the brightest part of the beam and to eliminate light spill.

Principle 7: Direct light away from reflective surfaces.

During the design phase, it is advisable to choose surfaces with low reflectivity near outdoor lighting that align with the intended function of the area. Illuminance, which measures the amount of light reflected off a surface, depends on the material's reflective characteristics. For instance, natural grass surfaces typically produce low illuminance, whereas lighter-coloured surfaces such as uncoloured concrete, artificial grass with sand infill, or pale walls, can reflect more light.



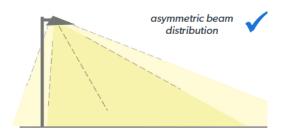


Figure 7 Appropriate light fixtures for floodlighting

Restricted Lighting

Lighting on advertisement signage is prohibited, except where it can be demonstrated that it meets the principles of 'Dark Sky Friendly Lighting'.

Digital signage is the recommended approach to advertising. Digital signage is subject to tighter controls through the Australian Standards AS/NZS 4282:2023 Control of obtrusive effects of outdoor lighting.

Digital signage must:

- Result in 50% less light spill to dwellings when displaying dynamic content.
- Have a maximum upward light rate of 45%.
- Be tested in a photometric lab to accurately determine light spill to environment.
- Be dimmable to ensure compliance and demonstrate the enabling of this dimming capability at required times of the night.

The use of searchlights is prohibited within the Swan Reach Conservation Park, except when used by emergency personnel.

Monitoring

The Mid Murray Council will deploy a Dark Sky Monitoring Grid comprising:

- Sky quality meters (SQMs) at regular intervals (positioned as required) to measure ambient light levels and track compliance with DarkSky International's artificial brightness thresholds (>0.5 mcd/m²).
- Alternative to installed SQMs deploy drone or mobile light meter technology to assess ambient light levels on a periodic basis.
- GIS-enabled dashboards to visualise realtime data, identifying hotspots of noncompliant lighting for targeted enforcement.

Private landowners within the Reserve must grant access to Council-operated sensors installed or mobile measurements taken on their properties, ensuring uninterrupted data collection. Exemptions apply only to classified agricultural or industrial zones.

Community Engagement

Launch a Dark Sky Citizens Science Program levering smart devices.

Residents may install Council-provided light pollution apps (e.g. Loss of the Night) to report non-compliant fixtures via geotagged photos.

Data from community reports will integrate with the Council's monitoring grid, prioritising areas for educational outreach.

Develop Augmented Reality (AR) Astro Tourism Tools, such as:

- Constellation-guiding mobile apps with red-light night vision modes to enhance stargazing without disrupting dark adaptation.
- Interactive kiosks at reserve entry points displaying real-time sky quality metrics and optimal viewing locations.

Smart Technology

Implement smart technology solution to assist with the measurement, control and compliance with Dark Sky principles and DarkSky International requirements for certification.

Implement Machine Learning-Driven Lighting Curfews:

- Analyse historical traffic, weather, and tourism data to dynamically adjust lighting schedules in commercial zones.
- For example, reduce streetlight intensity by 70% during low-activity periods (00:00-04:00) while maintaining safety in highpedestrian areas.

Implement smart technology assessment criteria to development approvals where new outdoor lighting is included in a development application.

Compliance

To ensure compliance with the Light Management Plan and the overarching guidelines of DarkSky International, the following is required to occur:

- A commitment from Mid Murray Council and South Australian Power Networks when renewing/replacing public outdoor lighting in the RMIDSR that meet the principles of 'Dark Sky friendly lighting'.
- All outdoor public lighting which is noncompliant and needs replacing must be fitted with compliant fixtures. If a light can be made complying by replacing the light bulb, this must be done when the lamp dies.

By 2026, 90% of outdoor lighting within the RMIDSR will be compliant with this Light Management Plan.

By 2031, 100% of outdoor lighting within the RMIDSR will be compliant with this Light Management Plan.

Reporting

An annual report will be submitted to DarkSky International, detailing the progress made to achieve their goals and provide monitoring of dark sky measurements within the Reserve. This annual report will be undertaken by the Mid Murray Landcare SA Inc. with assistance as required from Mid Murray Council.





Glossary

Augmented Reality – Augmented Reality (AR) is a technology that overlays digital information such as images, 3D models, text, audio, or other sensory enhancements onto the real-world environment in real time, typically through devices like smartphones, tablets, AR glasses, or head-mounted displays. Unlike virtual reality, which immerses users in a completely simulated environment, AR enhances and modifies the user's perception of their actual surroundings by blending virtual elements with the physical world.

CCT – Correlated Colour Temperature – is a specification used in lighting to describe the colour appearance of the light emitted by a source, relating it to the colour of light produced by an ideal blackbody radiator at a specific temperature, measured in degrees Kelvin (K). Lower CCT values (e.g. 2700K-3000K) produce a warm, yellowish or reddish light, similar to incandescent bulbs or sunrise/sunset. Higher CCT values (e.g. 5000K-6500K) emit a cool, bluish-white light, resembling daylight at noon or some fluorescent and LED lights.

Digital Signage – Digital signage is an electronic display system that uses digital screens (such as LCD, LED, OLED, or projectors) to show multimedia content like images, videos, graphics, and text for communication, advertising, or information purposes.

Lumens – A lumen (symbol: lm) is the International System of Units (SI) measurement for luminous flux, which quantifies the total amount of visible light emitted by a source as perceived by the human eye. In practical terms, lumens measure how bright a light source appears: the higher the lumen value, the brighter the light.

Lux – Lux (symbol: lx) is the International System of Units (SI) measurement for illuminance, which quantifies the amount of light that falls on a given surface area. Specifically, one lux is defined as the

illumination produced when one lumen (the total amount of visible light emitted by a source) is evenly distributed over one square metre.

Shielding – Light shielding in lighting refers to the use of physical barriers, such as casings, covers, caps or shields, to control and direct the distribution of light emitted by a fixture. The primary goals of light shielding are to:

- Reduce glare, which can cause discomfort or temporary blindness.
- Minimise light spill or trespass onto neighbouring properties.
- Prevent skyglow, which obscures the night sky.
- Guide light to desired areas, improving efficiency and visibility.

Sky Quality Meters – A Sky Quality Meter (SQM) – is a scientific instrument designed to measure the luminance (brightness) of the night sky, specifically as the zenith (the point directly overhead). It quantifies the night sky brightness using the unit "magnitudes per square arcsecond," a logarithmic scale commonly used by astronomers to assess skyglow and light pollution.

YES, ABORIGINAL AUSTRALIANS CAN AND DID DISCOVER THE VARIABILITY OF BETELGEUSE

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Abstract: Recently, a widely publicized claim has been made that the Aboriginal Australians discovered the variability of the red star Betelgeuse in the modern Orion, plus the variability of two other prominent red stars: Aldebaran and Antares. This result has excited the usual healthy skepticism, with questions about whether any untrained peoples can discover the variability and whether such a discovery is likely to be placed into lore and transmitted for long periods of time. Here, I am offering an independent evaluation, based on broad experience with naked-eye sky viewing and astro-history. I find that it is easy for inexperienced observers to detect the variability of Betelgeuse over its range in brightness from V = 0.0 to V = 1.3, for example in noticing from season-to-season that the star varies from significantly brighter than Procyon to being greatly fainter than Procyon. Further, indigenous peoples in the Southern Hemisphere inevitably kept watch on the prominent red star, so it is inevitable that the variability of Betelgeuse was discovered many times over during the last 65 millennia. The processes of placing this discovery into a cultural context (in this case, put into morality stories) and the faithful transmission for many millennia is confidently known for the Aboriginal Australians in particular. So this shows that the whole claim for a changing Betelgeuse in the Aboriginal Australian lore is both plausible and likely. Given that the discovery and transmission is easily possible, the real proof is that the Aboriginal lore gives an unambiguous statement that these stars do indeed vary in brightness, as collected by many ethnographers over a century ago from many Aboriginal groups. So I strongly conclude that the Aboriginal Australians could and did discover the variability of Betelgeuse, Aldebaran, and Antares.

Keywords: Aboriginal astronomy, variable stars: Betelgeuse, Antares, Aldebaran

1 INTRODUCTION

Betelgeuse (α Ori) is the bright red supergiant star in the shoulder of Orion, and it varies in brightness from visual magnitude 0.0 to 1.3 mag with a quasi-periodicity of 423 days. This variability was first 'discovered' by Sir John Herschel in 1836, or at least this was the first surviving observation to make it into Western science journals. Recently, there has been substantial excitement in the press and in the international variable star communities over a claim that the Aboriginal Australians had long ago discovered the variability of Betelgeuse (plus Aldebaran and Antares) and incorporated this discovery into lore passed down through untold generations, and being even today recognizable by ethnographers who have collected this lore.

The Aboriginal Australian discovery was first noted by Fredrick (2008) then described in more depth in Leaman and Hamacher (2014) and further analyzed in Hamacher (2018). They point to lore collected a century ago from southern and central Australia for multiple groups, with two basic stories plus the usual variants. The first story is about a hunter (represented by the modern stars of Orion) chasing after some young sisters (represented by the Pleiades), with his 'fire lust' (represented in the star Betelgeuse) waxing and waning, while the older protective sister's left foot (represented by Aldebaran) also fills and empties of the 'fire magic'. The second story is also a morality tale, with a story about a young male initiate (named Waiyungari) covered

in red ochre running away into the sky, where he now sits in a canoe on the Milky Way, flanked by two stars representing two women, being prominent in the September evening skies. Waiyungari is definitively identified as Antares. The lore states that when Waiyungari brightens and gets hotter, this increases the sexual desire of the people. These are clear statements from multiple communities and multiple ethnographers that the three red stars get brighter and fainter.

This basic claim (that the Aboriginal Australians discovered the variability of Betelgeuse) has excited skepticism in some quarters. The unstated root of this skepticism is the view that Aboriginal people were too 'primitive' to be able to make a discovery that is more typical of modern Western science, as well as a general frustration from having heard so many implausible claims of discoveries of lost-ancient-wisdom. This skepticism can be itemized under the question "How could the Aboriginal Australians discover the variability when so many great Western astronomical observers from before 1836 all missed it?" and under the statement "The variability of Betelgeuse is too subtle and infrequent for any casual discovery".

In this note, I will be evaluating the basic claim that the Aboriginal Australians did discover the variability of Betelgeuse. This is just an independent and critical examination of prominent claims in the field of the history and heritage of astronomy, as our field so desperately needs.

2 CAN VARIABILITY BE DISCOVERED?

The first question is as to whether the variability of Betelgeuse *can* be detected by inexperienced observers with no variable star training?

Betelgeuse varies between visual magnitudes of 0.0 and 1.3. This can be directly visually compared with Capella (V = 0.08), Rigel (V = 0.13), Procyon (V = 0.38), Pollux (V = 1.14), Adhara (V = 1.50) and Bellatrix (V = 1.64). So it variously is brighter than nearby Capella and Rigel (and being substantially brighter than nearby Procyon), all the way down to being fainter than Pollux. These are blatant changes, made obvious by the good nearby comparison stars.

The human eye is good for comparing nearby stars, even with a need to glance back and forth (as well known to the many amateur variable star observers). Inexperienced people can detect substantial differences in brightnesses of near 0.3 mag, while well-experienced observers can get as good as 0.10 mag. These approximate numbers are well known, and I have confirmed them with a variety of experiments with many subjects, as well as large-scale experiments with the American Association of Variable Star Observers (AAVSO). What is needed is a small set of relatively nearby comparison stars, best with their magnitudes at the top, middle, and bottom of the range. And that is exactly what we have for Betelgeuse (and Aldebaran and Antares). Direct visual comparison of stars is easy for separations of ~60° or less, and indeed variable star observers have long made visual estimates while looking in eyepieces with apparent fields diameters of 60°. Rigel is 18° away, so this apparent separation is very easy for accurate and natural comparisons. Procyon, Pollux, and Capella are within 23° to 39°, all at comfortable distances for comparison. The primary visual comparison might be with the relatively nearby and connected star Procyon, and it will be easy to remember that Betelgeuse is brighter-than, roughly-equal-to, fainter-than, or much-fainter-than Rigel. With Betelgeuse's historical range of 0.0 to 1.3, its variability can be easily detected for either experienced or inexperienced observers.

Hamacher (2018) furthers claim that Australian Aboriginal lore contains unmistakable reports of the long-term pulsations of the red stars Aldebaran and Antares. Aldebaran is a red giant star that varies from 0.7 to 1.2 mag (from the AAVSO data) with variability time scales of around a year. Aldebaran has the same good comparison stars as Betelgeuse. Antares is a red supergiant star that varies from 0.7 to 1.7 mag (from the AAVSO data) with a pulsational timescale of 5.97 years on average. Antares has good comparison stars including Hadar (V = 0.63), Altair (V = 0.93), Spica (V = 1.05), Acrux

(V = 1.27), Mimosa (V = 1.30) and Shaula (V = 1.62). With these amplitudes, time scales, and comparison stars, the variability of both Aldebaran and Antares can be easily detected for either experienced or inexperienced observers.¹

The changes are so blatant that written records are not needed, as it is easy to remember that Betelgeuse is, say, greatly brighter than Procyon, whereas in the past year it was greatly fainter than Rigel. That is the sort of comparison that humans are good at.

So my strong conclusion is "Yes, the ordinary variability of Betelgeuse is easily discovered by inexperienced observers."

3 COULD THE DISCOVERY BE PASSED ON IN LORE?

As an astronomy historian, I specialize in visual photometry in old times (see for example, Schaefer, 1993; 1996; 2001; 2013a; 2013b), and I recognize that it takes more than just ability for a culture to make a discovery. In the case of John Herschel, he was explicitly measuring magnitudes of all stars in the sky, and this is how he discovered Betelgeuse's variability, whereupon he passed his finding into the scientific literature. Pliny tells us that variability-searches are the exact reason why Hipparchus created his original star catalog. But why should Aboriginal Australians (or any other culture outside of the Greek-descended tradition) be looking for variability, much less pass it on?

Well, there is no particular reason to expect that the Aboriginal Australians did any systematic variability-searching. But systematic searches are not needed for discovery. For the many waking hours during each night, the only light away from the campfire is up in the stars, so these were frequently seen throughout the lives of Aboriginal people. Betelgeuse is among the brightest dozen or so stars, while it is in a striking pattern in modern Orion, and has a striking color-so if you are repeatedly looking at stars, then Betelgeuse would be a natural and frequent target. This always-under-the-skies lifestyle for Aboriginal people with the dark Outback skies is completely alien to modern scholars who rarely venture outside of our modern lightpolluted skies.

Indigenous people the world over are renown for exhaustive observations of all of nature around them (e.g. Norris, 2016; Ruggles, 2011), as it is critical for survival. So it is inevitable that many Aboriginal people over the millennia would watch Betelgeuse sufficiently closely to easily recognize that it varies from brighter-than to much-fainter-than Procyon. No written records are needed for such observations, and the memory of prior brightness extremes needs to be kept for only half a year or so.² Thus, it is

reasonable and inevitable that many Aboriginal people (and many people from other cultures) over the millennia discovered the variability of Betelgeuse.

A possible counter-argument is that Betelgeuse's variability was missed by excellent Western observers, such as Ptolemy, Tycho Brahe, and William Herschel, and hence was not discovered by the Aboriginal Australians. The logic of this counter-argument is unusably poor because every sky phenomenon has a first surviving discoverer, but this says nothing about earlier observers whose discoveries might not be documented in refereed journals. Arguments by historic ignorance are poor logic. One pervasive and well-documented case is that the existence of atmospheric extinction was never reported anywhere in any source in any way before 1727, yet Ptolemy, Al-Sufi, Tycho, and Hevelius all independently discovered the dimming of light by our atmosphere. They modeled the quantitative dimming in magnitudes as a function of altitude, and reported extinctioncorrected magnitudes in their star catalogs (Schaefer 2013b), yet there is no record of their measurements or even that they knew the atmosphere dims light. And are we really to say that the first record in science journals of the Green Flash invalidates Jules Verne's earlier book highlighting the Green Flash (Le Rayon Verde) dated 1882, or indeed that myriads of sunset watchers the world over have not made many independent discoveries of the Green Flash? As another example, the phenomenon of mountain-shadows-cast-onto-air-as-cones-ofdarkness was first published in the early 1900s, yet this does not invalidate the 1789 painting from the top of Snaefellsjokull that clearly shows the phenomenon (Pocock, 1791), nor does it invalidate the correct description of the shadow from the Canary Islands in Arthur Conan Doyle's 1884 "J. Habakuk Jephson's Statement", nor does it invalidate the long lore of mountain shadows for Mount Fuji and for Mauna Kea. And so on. The point is that just because one-goodperson misses a phenomenon, this means nothing about whether the Aboriginal Australians, or Sioux Indians, or Victorian-era writers independently discovered the same phenomenon.

Another question is whether a discovery gets saved as a report that survives to be seen by modern scholars. Certainly, a large fraction of discoveries are lost to posterity for any of many reasons. In literate societies, the discovery must be written down and that record somehow saved until modern times. In cultures without writing, the discovery must become part of the lore passed along through the generations, and continue on long enough to be recorded by an ethnographer. Nevertheless, there are well

known paths for putting the discovery into recognizable lore, and for reliably passing the lore on through many centuries.

For putting the discovery into lore, it must be made somehow culturally relevant. Let me give some astronomical examples:

- (1) The 8th-millenium tightest planetary massing on 26 February 1953 BCE was made culturally relevant for the ancient Chinese as being the start date for calendars and as inspiring the start of the *Mandate of Heaven* doctrine (Schaefer, 2000). This was passed along orally for over a millennium before being written down.
- (2) For naked-eye variable stars, the variations of Algol passed into the calendars of ancient Egypt (Jetsu et al., 2013) and passed into complex mythology associated with Medusa, as appropriate for the sky, by the ancient Greeks (Wilk, 2000).
- (3) The knowledge of the very rare total solar eclipses (every 310 years on average from any one location) has passed into the lore of all old cultures worldwide as being one of the worst omens possible (Schaefer, 1994). The universal abject fear of these events can only be remembered by the events entering as lore passed down for many generations. This conversion of a celestial event into lore is applicable in Australia (Norris, 2016: Section 2.4).
- (4) Many more Aboriginal Australian examples are cited in the review of Norris (2016), including the Emu in the sky (mostly defined by the dark clouds in the Milky Way from the Coalsack to Sagittarius) showing a depiction of the flying bird with an explanation for how the emu lost the ability to fly.

The point of these examples is to show how sky events/pictures can get passed into the traditions and stories of indigenous cultures for a wide variety of reasons. In particular, the lore involving the three red stars was incorporated into Aboriginal traditions as morality tales.

Once in an oral culture's lore, the information must pass through many generations without substantial garbling. Famous examples are the epic poetry of Homer passed for many centuries, the chief lists and navigation records of the Polynesians passed for a millennium, and sky lore of the Great Bear passed along after crossing the Bering Strait for over 14 millennia. The theory of this faithful transmission is well described (Kelly, 2015). Aboriginal Australian examples include coastline flooding roughly 7 millennia ago (Nunn and Reid, 2016), reports of the meteorite fall that formed the Henbury craters approximately 4 millennia ago (Hamacher, 2013), and the Great Eruption of the star η Carinae about 150 years ago (Hamacher and Frew, 2010). So we can be sure that lore is often faithfully transmitted for many centuries and millennia.

4 DID ABORIGINAL AUSTRALIANS DISCOVER BETELGEUSE'S VARIABILITY?

So the variability of Betelgeuse is readily discovered by Aboriginal Australians. Indeed, it is inevitable that Aboriginal people would make this discovery many times over their many millennia of close nature observing under the wonderful Outback skies, and such a discovery can easily be placed into Aboriginal lore, and then passed down many generations until recorded by ethnographers and anthropologists interviewing elders. So the whole claim of Aboriginal Australian discovery of Betelgeuse's variability is easily possible. But many ideas for transmissions of discoveries are possible. So the real question is not whether the Aboriginal Australians could make the discovery and pass this along as lore, but whether they did.

I have spent about 25% of my career in astro-history and celestial visibility (specializing in visual photometry) debunking ideas where someone claims that some astronomical event is possible and hence such-and-so culture must have observed it (see for example Schaefer, 1983; 1991; 2006). These claims and reports all have the unifying and critical issue that they offer zero positive evidence other than the one lore or text item that they are trying to explain. Often these claims are fairly spectacular, represent an isolated report, are often anachronisms that are not plausible within the cultural context, and typically run afoul with technical errors. The variability of Betelgeuse is not spectacular. It is reported by multiple independent communities, for other known red variable stars easily fits into the cultural context, and has no technical problems.

My knee-jerk reaction is to be skeptical of any claim for ancient knowledge, and many others in our community might be similarly biased. The reason is that we see so many bad claims, usually for exotic discoveries, where there is no positive evidence. Wrong biases against the Betelgeuse-variability-discovery result also arise in other communities. For example, the astro-history community has a bias against anything that does not have documenttation. Under this bias, the ethnographic reports are not counted as 'documentation'. communities believe that Indigenous peoples were incapable of making any discoveries paralleling something from Western science. Such argumentation is wrong. The existence of bad claims with no evidence has no relevance for a claim supported by significant positive evidence

and excellent ethnographic documentation from oral cultures with complex knowledge of nature. I am stating these various biases explicitly, so that we all can hopefully expunge them from our inner thinking.

Another reason to often be skeptical of such claims for ancient knowledge is that the lore or text is ambiguous, requiring some arcane decoding. Yes, old lore and documents can and do report events and facts in symbolic or poetic language, but there are a myriad of possible decodings for anything other than blatant symbolism. So in general, decoding is fruitless because any interpretation is just indistinguishable as one of many. But we do not have such ambiguities for the cases of the three red stars. There is adequate sky lore describing the constellations such that the identification of the stars is clear, with no plausible alternatives. And the Aboriginal lore explicitly says that the star changes in brightness, with recurring waxing and waning.

For the guestion of whether the Aboriginal Australians did discover the variability of the three red stars, the direct words and ethnographic reports provides the proof. For Betelgeuse and Aldebaran, we have firsthand ethnographic documentation from Daisy Bates in 1921 from Aboriginal groups in the Great Vic-For Antares, we have ethnotoria Desert. graphic documentation from South Australia by H.A.E. Meyer in 1846, Norman Tindale in 1935, and Philip Clarke in 1999. Aboriginal people do tell us, many times over, from multiple communities, that these stars vary in brightness. The ethnography provides the proof that Aboriginal people actually did discover the variability of Betelgeuse.

5 CONCLUSION

So the case for the Aboriginal Australian discovery of the variability of Betelgeuse, Aldebaran, and Antares, is:

- (1) It is easily possible to detect variability from 0.0 mag to 1.3 mag by inexperienced observers:
- (2) We know that the Aboriginal people were intensive and exhaustive observers of their natural environment, including the stars, so Betelgeuse, as one of the brightest dozen stars and distinctly colored, will have been watched many times over by many Aboriginal people over the past 50 millennia;
- (3) Some fraction of these many watchers will remember recent times when Betelgeuse was at an obviously different state, hence discovering its variability;
- (4) Only some small fraction of these discoveries need be saved into the lore, with the

- reason being that it was placed into morality stories:
- (5) Once into the Aboriginal lore, we know that this information can be transmitted reliably over centuries and millennia.
- (6) But the real proof for the Aboriginal discovery of these stars' variability is that the Aboriginal people themselves report that they vary in brightness.

This review of the claim for Aboriginal discovery of Betelgeuse's variability is also a review of the general methodology and results of pulling astronomical information from the ethnographic record, both for Aboriginal Australians in particular and many ancient or oral cultures in general. What I have found is partly a mixed set of evaluations. Many claims coming from fringe workers have no compelling evidence, are contrary to cultural plausibility, and are often technically wrong. Nevertheless, many claims are confident with plenty of evidence, cultural plausibility, and no technical problems. What I am concluding is that the basic methods are fine and convincing, but care must be taken to recognize and marginalize fringe claims. In particular, fringe claims tend to dominate the press and the internet, so inexperienced people can easily be misled into accepting claims that are known-wrong. This can skew and screw the whole field, with archaeoastronomy being an example, where the majority of press reports and popular knowledge are known to be flat wrong. It is unclear how to handle the flood of evocative fringe claims, but our scholarly community must start by making evaluations of claims, and not shy away from declaring 'Wrona!'.

For the field of Australian Aboriginal astroomy with attention to variable stars, we also see the full range of claims made. We see evidence-less claims for supernova depictions in Aboriginal rock art (Murdin, 1981), with this just being part of a worldwide movement to depict any old squiggle as a supernova. But we also see Hamacher (2014) correctly rejecting all of these erroneous claims, and establishing a set of criteria for confirming novae/supernovae descriptions in oral traditions or motifs in material culture. Also, Hamacher and Frew (2010) demonstrated that the weird and unique eruption of the Luminous Blue Variable star η Carinae in the 1840s was transferred into the oral traditions of the Boorong peoples in Victoria, near Lake Tyrrell, and proved this connection with concurrent ethnographic reports. Now, Leaman and Hamacher (2014) and Hamacher (2018) report Aboriginal discovery of the variability of three red giant stars, with this discovery being both easy and inevitable, while we know that the discoveries have been placed into lore multiple

times, as proven from the ethnographic record. The last three examples provide good exemplars for future workers in our field.

In summary, we can be very confident that Aboriginal Australians did discover the variability of Betelgeuse, Aldebaran and Antares, and described them in oral traditions that were passed down to modern times.

6 NOTES

- 1. We need not be worried by effects such as differential extinction or the Pukinje effect. For Australian skies, the stars of Orion always reach high altitudes with typical extinction coefficients of 0.3 mag/airmass, so we have negligible differential extinction. The amateur astronomer's Purkinje Effect, with red stars changing in apparent brightness as the star is stared at, only affects stars seen with night vision, whereas Betelgeuse is so bright as to be well above the threshold between day/night vision (V ≈ 3.1), as proven by Betelgeuse appearing reddish in color.
- Betelgeuse cycles between maxima and minima with a typical time scale of half the pulsation quasi-periodicity of 423 days.

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Seventy of these publications are on the history of astronomy, with a unique specialization in celestial visibility, in what constitutes a separate career. But really, Schaefer is just an avid amateur astronomer, even now running many visual projects and skytourism. For example, he has been a member of the Ameri-

can Association of Variable Star Observers (AAVSO) since 1972, working on a wide variety of programs. Starting in May 2018, Schaefer will travel to Australia, departing in November 2018, with part of the purpose being to do visual photometry and sight-seeing in the great Outback skies. One of the programs for Australia is to (for the second time) completely map the entire sky for all stars as viewed with the unaided eye.

Dark Sky Policy



Policy Number	POL-DKSKYV2
File Number	5/POL/DSKY/2
Responsible Officer	Director – Development and Community Services
Adopted	8 May 2018
Last reviewed at Council Meeting	19 August 2025
Minute Number	C08-25/017
Due date of next Review	August 2029

1. Purpose

The purpose of this policy is to ensure:

- 1.1 Mid Murray Council's commitment to encouraging and preserving the natural dark skies in the area known as the "River Murray International Dark Sky Reserve" (the Dark Sky Reserve).
- 1.2 Along with the Light Management Plan, this Policy's objective is to ensure that the Dark Sky Reserve satisfies the criteria set by DarkSky International ensuring its promotion and longevity.

2. Policy

- 2.1 Mid Murray Council acknowledges the uniqueness and importance of the Dark Sky Reserve and aims to preserve, protect and enhance the night sky within the defined area. The distinctive and exclusive opportunities resulting from a formal internationally recognised Dark Sky Reserve, including the promotion of the Mid Murray District overall is supported and encouraged.
- 2.2 Council supports measures described within the Light Management Plan to ensure that the already naturally dark sky in the scoped area is not only protected, but also further enhanced through various approaches including lighting education programs and reducing the number of lights and modifications to existing outdoor light fittings and globes.
- 2.3 Council commits to encourage other locations to become environmental leaders on dark sky issues by communicating the importance of dark skies and by providing an example of what is possible with excellence in community education, application of policy and leadership in innovation to achieve and maintain the natural resources of dark skies.
- 2.4 The primary aims of this Policy are:
 - 2.4.1 To raise community awareness of the River Murray International Dark Sky Reserve and seek their assistance and support in maintaining the Dark Sky.
 - 2.4.2 To ensure that Council, other Government bodies and private landholders within the scoped area understand the importance and value they provide through their assistance in preserving, enhancing and promoting the Dark Sky Reserve.
 - 2.4.3 To promote the River Murray International Dark Sky Reserve as part of Council's economic development and tourism plan, with the aim to attract tourists from around the world.

- 2.4.4 To provide guidance and education to all occupiers, both individuals and organisations, within the scoped area on how best to undertake development and operate their sites without negatively impacting the Dark Sky Reserve.
- 2.4.5 To educate the community on the impact of Artificial Light at Night (ALAN) on Human, Flora and Fauna throughout the local government area and in particular in the close surrounding areas of the Dark Sky Reserve. Education resources may be developed through the ongoing relationships with the Australasian Dark Sky Alliance and DarkSky International and other research and industry expert resources.
- 2.4.6 To continue to actively engage with local residents in the surrounding towns and areas of the Dark Sky Reserve, providing advice and guidance on good lighting practices that are Dark Sky compliant. In particular this is required to ensure that no lighting is to be projected directly into the Dark Sky Reserve.
- 2.4.7 This Policy and associated Light Management Plan should in no way endanger human safety, road traffic, farm livestock or farming activities by restrictive lighting practices.
- 2.5 Mid Murray Council recognises its statutory role relating to development and that the associated design elements must align with the State's Planning and Design Code, the Building Code of Australia and relevant Australian Standards. This Policy may also be used to frame future statutory planning policy.
- 2.6 So far as reasonably practicable and to ensure compliance with the overarching guidelines of the International Dark Sky Association, the following criteria shall be met by any new developments within the scoped area:
 - 2.6.1 Lighting plans must be provided with any new Development Applications that will lead to the development of new external lighting, or is a development of a commercial nature, within the River Murray International Dark Sky Reserve.
 - 2.6.2 Assessment against the table/matrix detailing appropriate lighting types, levels and locations when considering new Development Applications, and when renewing/replacing lighting.
 - 2.6.3 No lighting shall be directed towards the sky (unless required for safety reasons), and all proposed outdoor lighting must be of a design that minimises light spill.
 - 2.6.4 Lighting plans shall also consider the environmental impact of Artificial Light at Night, on the local environment, including human, fauna and flora as much as possible.
- 2.7 Mid Murray Council commits to ensuring Dark Sky appropriate lighting will be designed/located accordingly when renewing/replacing Council owned/operated lighting within the scoped area.
- 2.8 Mid Murray Council also recognises the impact of illuminated signage contributing to artificial light at night (ALAN) and its impact on Dark Sky compliance and the ecosystem in which it is located. Approved illuminated signage must comply with the guidelines shown in the Council's Light Management Plan.
- 2.9 This Policy also considers the growing availability of smart technologies to assist with the control of ALAN. The Council looks to apply best practice and innovative solutions for the application of smart technology lighting solutions where practicable. A smart technology approach to ALAN ensures that the Council is leading the community in the application of these technologies as well as offering education to the community in benefits of applying such technologies through a localised methodology.

3. Scope

This Policy applies to the Dark Sky Reserve, a geographical area covering more than 3,200 square kilometres.

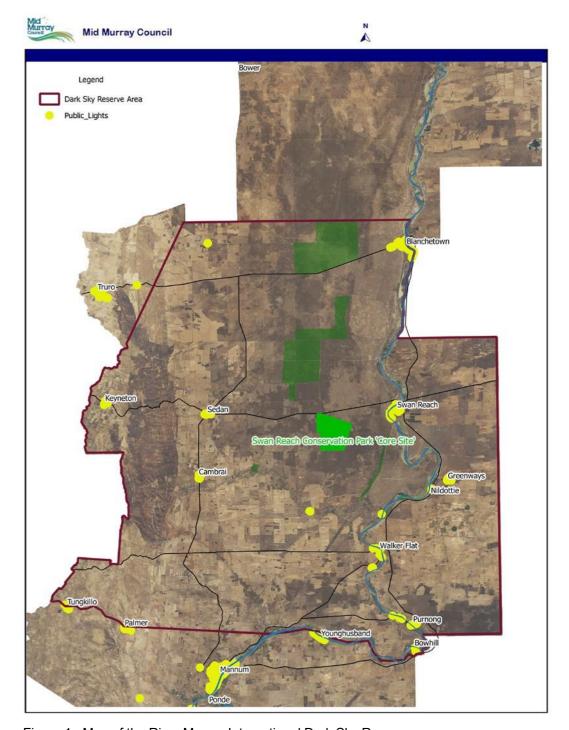


Figure 1: Map of the River Murray International Dark Sky Reserve

4. Policy Responsibility

The Director – Development and Community Services is responsible for ensuring the proper operation of this Policy.

5. Availability/Accessibility

- 5.1 <u>This Policy</u> and Council's <u>Fees & Charges Register</u> are available to be downloaded free of charge from Council's website: <u>www.mid-murray.sa.gov.au</u>.
- 5.2 This Policy is available for inspection at Council's principal office during ordinary business hours. Hard copies, for a fee in accordance with Council's schedule of Fees and Charges, can be provided upon request.

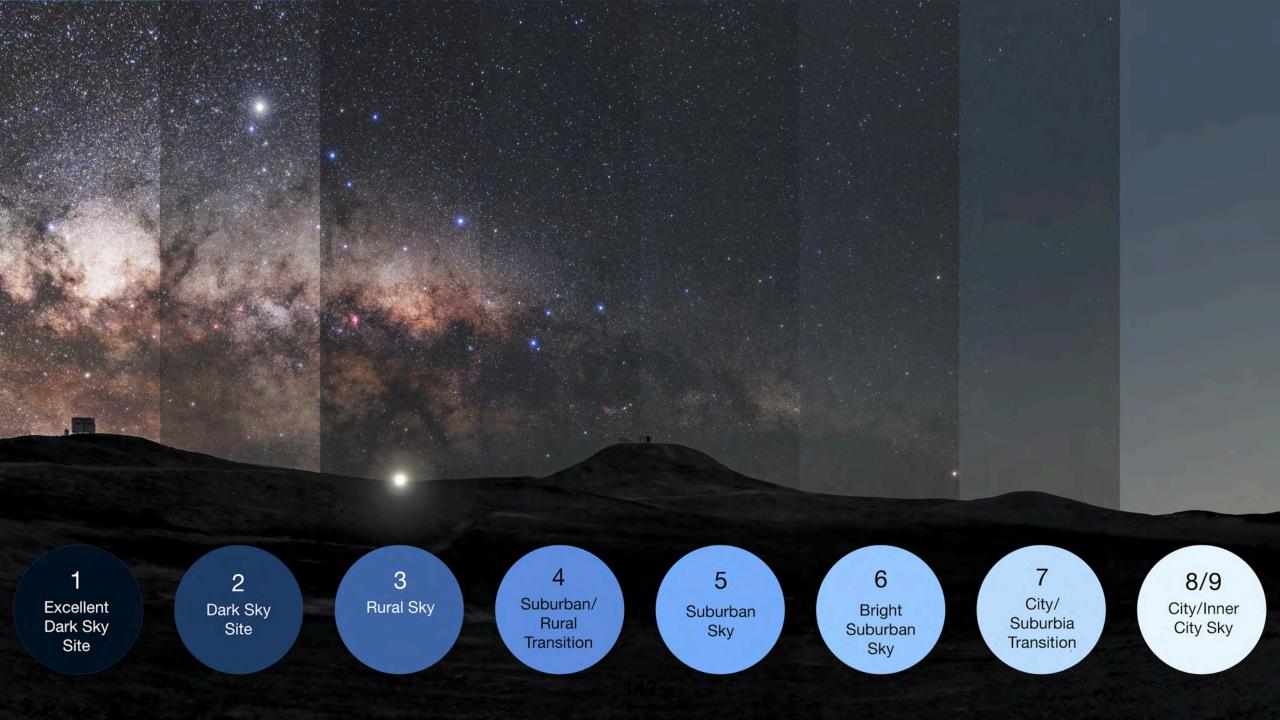
6. Legislative Framework / Other References

- 6.1 Local Government Act 1999
- 6.2 Planning, Development and Infrastructure Act 2016
- 6.3 Planning and Design Code
- 6.4 <u>Light Management Plan</u>
- 6.5 <u>National Light Pollution Guidelines for Wildlife May 2023</u> Department of Climate Change, Energy, the Environment and Water

7. Document History

This Policy shall be reviewed at least every four (4) years or more frequently if legislation or Council requires.

Version	Adopted	Minute	Description of Change
1	8 May 2018	20421/1	Adopted
2	19 August 2025	C08-25/017	 Amendments made to include: Integration of smart technology. Stronger emphasis on environmental impact. Clearer planning and development requirements. Commitment to community education and leadership. Expanded scope for compliance and innovation.



SEST PRACTICES

SEST PRACTICES SKY AN INTRODUCTION FOR LOCALITY PLANNING

RURAL PLANNING GROUP



Special thanks for review and consultation on this document:

John Barentine, *International Dark Sky Association*, Director of Conservation

Bettymaya Foott, *Colorado Plateau Dark Sky Cooperative*, Coordinator



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"Appreciation for dark skies is entering the social consciousness.

Light pollution is one of the only types of pollution that's completely and immediately reversible. I don't think we'll realize the value of seeing the Milky Way, until it's gone."

Bettymaya Foott, Coordinator, Colorado Plateau Dark Sky Cooperative¹

THE DISAPPEARING NIGHT

When we think of natural resources, few of us think of darkness. Centuries ago, when human settlements were relatively free of artificial lighting, the moon and stars dominated the night sky. Street lighting as we know it began approximately 300 years ago with oil lamps placed on wooden poles. By the 19th century, gas lamps came into use and by the 20th century artificial electric lamps were widely used.

Advances in lighting technology have slowly flooded our world with light, and city nightscapes are now dominated by the artificial lighting of buildings, streets, signs, parking lots and open spaces. The stars and constellations are outshone by the light emanating from human development and even the brightest constellations are no longer fully visible to residents in and around large cities whose artificial glow can be seen from over 200 miles away.² While artificial lights are important for safety, sense of security, and navigation, light pollution results when lighting is excessive or inappropriately used.³

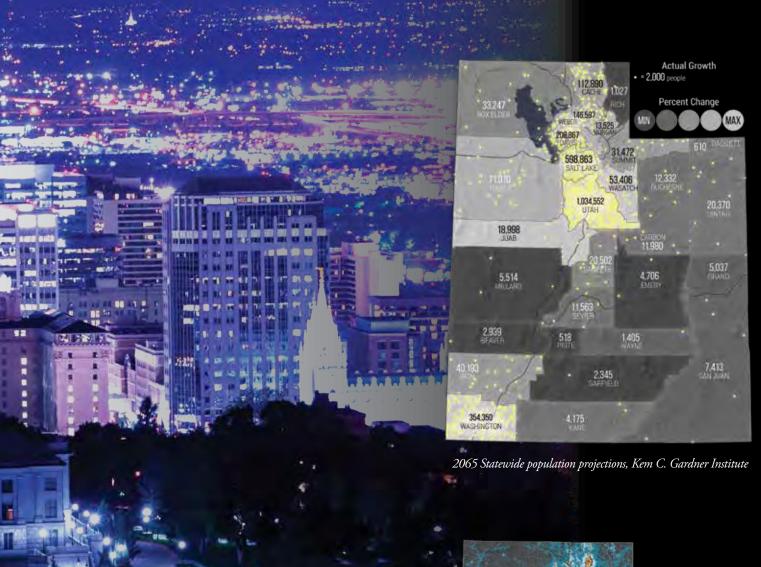




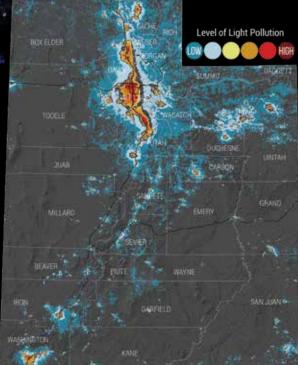
Light pollution has become synonymous with population growth, urbanization and human development. As one of the fasted growing states in the nation, Utah's population is projected to reach 5.8 million people by 2065. Much of that growth will be concentrated within the four Wasatch Front urban core counties, but projections show significant geographic expansion outwards. All 29 counties are projected to grow over the next 50 years.⁴ The majority of Utahns, along with the majority of the world's population, will live in urbanized areas without regular access to dark, star-filled skies. For naturally darker and less-populated

rural areas, dark sky protection is an important opportunity to preserve an ever-shrinking natural resource and capitalize on economic benefits including energy cost savings and increased tourism. map - statewide population projections.

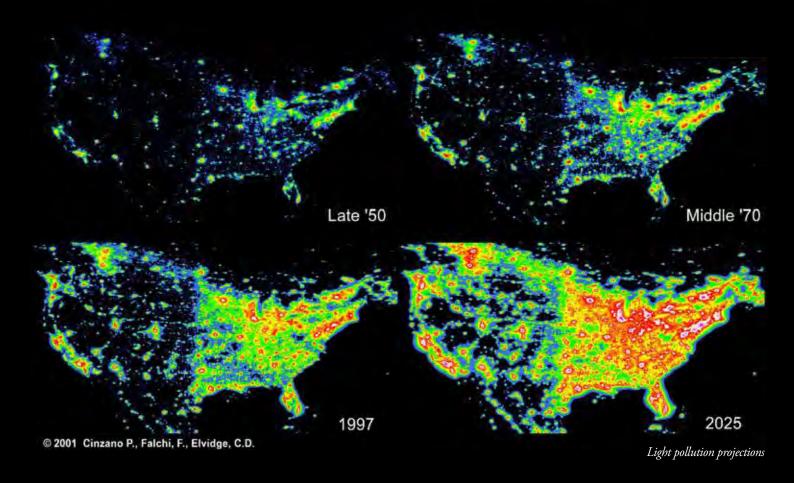
Light pollution is a threat because of the negative effects on humans and the environment as well as long-term consequences, such as biodiversity, economic, and cultural loss, that cannot easily be reversed.⁵ However, in contrast to other pollution, the negative effects of light pollution can be mitigated easily and cost-effectively.⁶



Utah is home to some of the darkest skies in the nation and is the national leader in dark sky protection and preservation. Many Utahns recognize natural nighttime darkness as an important natural resource and understand the economic, ecologic and cultural value of protecting the dark. This guide will help decision makers, community leaders, and residents understand the value of dark skies, provide important guidelines and resources in regards to their preservation and protection, and highlight a variety of dark sky efforts throughout the state.



Utah light polution map, www.lightpollutionmap VIIRS 2017





LIGHT POLLUTION

The International Dark-Sky Association (IDA), the leading non-profit organization dedicated to preserving night skies, defines light pollution as, "any adverse effect of artificial light, including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste." Today light pollution is a growing, global problem and is the result of poor lighting design and simple over use.

The ability to recognize poor lighting design and whether lighting is appropriate or excessive is the first step towards choosing appropriate solutions. For a more in-depth guide on identifying light pollution look for the Dark Sky Assessment Guide: A Quick Guide to Limiting Light Pollution available at www.ruralplanning.org/darksky_assessment.

FOUR CATEGORIES OF LIGHT POLLUTION

LIGHT TRESPASS When light falls where it is not wanted or needed. Use fully shielded light fixtures whenever possible.





DESIREABLE



GLARE Intense and blinding light that reduces visibility and causes discomfort. Direct light downwards and use the lowest adequate light intensity.





CLUTTER Excessive groupings of light sources that are bright and confusing. Only direct lighting onto desired areas and avoid excessive lighting.





SKYGLOW The brightening of the night sky over inhabited areas. Use fully shielded light fixtures, direct light downwards, use the lowest adequate light intensity, and optimize lighting placement.







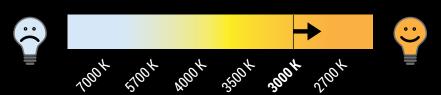
"Generally, use lighting where it's needed, when it's needed, and only as bright as needed."

BASIC DARK-SKY LIGHTING STANDARDS

SHIELDING OF FIXTURES Downward pointing, fully shielded lighting keeps unwanted light from escaping into surrounding areas and the sky above. They direct the light onto the desired areas and limit glare. Outdoor lighting should be "fully shielded," meaning no light emitted above a 90 degree angle. The more directed towards the intended subject, the better. Fully shielded lighting can be purchased or retrofitted.



Blue-rich lighting brightens the night sky more than warm colored lighting and researchers are beginning to connect blue light emission to negative health effects in people and greater problems for wildlife. The IDA recommends using long-wavelength lighting with a color temperature of 3000 Kelvin or less.



lighting can easily become excessive.

Limiting the total amount of installed lighting can help reduce light pollution. Designing for appropriate lighting levels includes shining lights down instead of up, directing light only onto desired areas, and using the lowest adequate bulb intensity. Timers, motion sensors, dimmer switches, and turning lights off when not in use can all contribute to darker skies, and in many cases, reduce municipal and property owner electrical costs.



LIGHT EMITTING DIODES (LEDS)

LEDs are essentially very small light bulbs that fit into an electrical circuit. In many communities, LEDs are replacing conventional highintensity discharge (HID) lamp types for outdoor lighting. The improved quality and lower prices make LEDs a very efficient alternative to HID lamps, but the central deficiency of early generation LEDs is that they emit an excessive amount of blue light.¹⁵ Outdoor lighting with high blue content is more likely to contribute to light pollution, increase glare and compromise human vision. Blue light at night has also been shown to adversely affect human health and wildlife behavior. 16 Today, a new generation of 3,000 K "warmer

color" LED products are available.

ENERGY SAVINGS

The most persuasive arguments for lighting control are economic. Globally, outdoor lighting makes up approximately eight percent of global energy use with about 60 percent of that wasted as unneeded, overlit or poorly aimed lighting. In the United States, approximately one-third of all lighting is wasted, and estimates suggest that nearly \$7 billion dollars of energy is wasted as light pollution annually. For every \$100 spent operating a dusk-to-dawn light fixture, \$45 is wasted on light that never reaches the ground.

Cities are now realizing the benefits of eliminating this energy waste through higher-quality, better-designed lighting. Today there are many energy efficient lighting alternatives that, when combined with proper design, can significantly reduce energy costs. The **IDA provides outdoor lighting basics** on their website, as well as information on where to find energy efficient and dark-sky friendly lighting. Visit www.darksky.org/lighting/lighting-basics for more information.



"... The bottom line for planners and elected officials is what's good for dark skies also saves money, by making sure light is used most efficiently—including the most effective ways to improve public safety."

John Barentine, IDA Director of Conservation¹¹



RETURN ON INVESTMENT (ROI)

The benefits of using more energy efficient lighting such as Light Emitting Diodes (LEDs) and adaptive lighting can be assessed through a Return on Investment (ROI) analysis. The following is a general overview of a city's ROI when investing in more energy efficient lighting and controls.

Simple ROI =
$$\frac{\text{(Gain - Cost)}}{\text{Cost}} \times 100$$

Formula:

For an LED retrofit of 97,500 street lights we would assume the following to define the ROI:

Gain from Investment

- 1. Luminaire life will be 20 years
- 2. 50% reduction in power consumption: \$3.25m x 20 years = \$32.5m
- 3. Maintenance costs will be reduced by 60 percent as the majority of these costs are for re-lamping \$3.54m x 20 years = \$35.5m
- 4. Total gain \$32.5m + \$35.5m = \$68m plus a factor of 1.2 to include power cost rise and increase labor costs = \$81.6M

Cost of Investment

- 1. Assume luminaire cost of \$500
- 2. Assume installation of \$60
- 3. Total cost $$560 \times 97,500 = $54.6m$

Simple ROI =
$$\frac{(\$81.6m - \$54.6m)}{\$54.6m}$$
 x 100 = 49.4%

The simple ROI from an LED retrofit would be approximately 50 percent. These costs and ROI are approximate and would require extensive study and evaluation to define further. The ROI should be considered an order of magnitude at best and will need to be verified by individual cities.

PROPERTY VALUE

Light trespass, the unwanted or unneeded invasion of light, is an issue because it interferes with a property owner's private enjoyment and use of his or her own land. Commercial property owners also face problems when outside light sources interfere with their business such as drive-in theaters, apartment complexes or other business entities. For the scientific world, light pollution disrupts and limits research conducted in astronomical observatories. ¹⁸

Dark skies can also enhance property values due to the scarcity of dark, starry skies. In select Western real estate listings, dark skies are even being used as a key selling point. Sedona, AZ for example, enjoys higher property values from being proactive about preserving dark skies, A recent Sedona property description included, "Private sunbathing during day - incredible red rock views and Dark Sky telescope observations at night!" ¹⁹ In Colorado, a new development called Summit Sky Ranch is building dark-sky preservation standards into the community's overall design, including streetlights and an observatory. Home prices start around \$600,000 compared to Denver's median home price of \$350,000. Incorporating dark sky ordinances into their design has contributed to the new development's overall attractiveness to potential buyers. ²⁰



of Artificial Night Sky Brightness, nearly 80 percent of North Americans cannot see the Milky Way due to light pollution.²² Places where the night skies are free from artificial light pollution have become increasingly popular tourist destinations. Astronomical Tourism, or "Astro Tourism," is a form of nature-based tourism specifically concerned with the viewing of celestial objects, space and the physical universe. Astrotourism is also one of the most sustainable forms of tourism.

While high levels of light pollution can be seen in the more populous areas of the U.S., primarily along the east and west coasts, there are also regions which exhibit very little light pollution, such as the Intermountain West.²³ Utah has many prime "dark sky friendly" places where tourism is already an important economic driver such as local gateway regions (defined as communities within 60 miles of a national park). In 2016, 14.4 Million park visitors spent an estimated \$1.1 Billion in local gateway regions while visiting NPS lands in Utah. These expenditures supported a total of 17.9 Thousand jobs, \$546.7 Million in labor income, \$886.1 Million in value added, and \$1.6 Billion in economic output in the Utah economy.²⁴

One of the many benefits of astro-tourism is that it generally leads to one or more overnight stays. According to the National Park Service (NPS) the average spending per-party per-day for a local day trip is \$40.63. This price rises to over \$430 for parties staying overnight in an NPS lodge and a little over \$290 for those staying in motels outside parks. One study suggested that, "from an economic standpoint, the single most important thing about darky-sky tourism is that it necessitates one or more overnight stays." Overnight stays naturally lead to increased spending by visitors and astro-tourism programs and activities increase the incentive to stay overnight. 26

In addition, astro-tourism can increase the number of visitors during the off-peak seasons since it is not a seasonally dependent activity. In fact, night sky viewing in winter is often better because of longer nights and greater clarity. More sustained periods of tourism activity ultimately provide local businesses with a steadier source of income and allow for a more efficient use of park and community resources.²⁷ Astro-tourism combined with dark sky designations, programs, and proactive planning efforts can attract new visitors and added revenue. In Utah, state parks managers have found that changing to night sky-enhancing fixtures and bulbs brings significant benefits to their parks' wildlife species, visitor experiences and revenue streams.²⁸

Economic Contributions of National Park Visitor Spending UTAH ECONOMY - 2016



Data Source: National Park Service



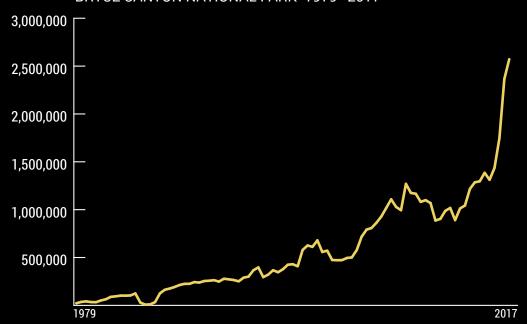
ASTRO-TOURISM IN BRYCE CANYON

A 2011 study²⁹ of astro-tourism in Bryce Canyon National Park found that a dark sky can be an important resource for a natural park—especially when combined with dark sky programming. Bryce Canyon National Park offers a variety of astronomy and night sky programs, and during the 2010 fiscal year 14,552 park visitors participated in one or more of Bryce Canyon's night sky activities and 146,847 park visitors stayed overnight.

In 2016, over 5.5 million people visited an International Dark Sky Park or a park within the International Dark Sky Places Program accreditation process in Utah. Based on statistics from the Bryce Canyon study, of those 5.5 million people a potential of 61,500 visitors would have participated in astronomy related programming (if available) and approximately 621,875 visitors would have stayed overnight. Data also suggest that park visitors will seek out dark sky parks more frequently than they have done in previous years. To rnational and state parks that have dark skies as a natural resource, astro-tourism represents an opportunity to expand park visitation—especially as dark skies become scarcer throughout the world.



Annual Park Recreation Visitation BRYCE CANYON NATIONAL PARK 1979–2017



Data Source: National Park Service

"Having internationally recognized dark skies bolsters our ability to attract more visitors and offer more night programming which results in more people enjoying our parks at more times of the day."

Fred Hayes, Utah State Parks Director²¹

CIRCADIAN DISRUPTION

One of the results of light pollution is increased exposure to both indoor and outdoor artificial light-at-night (ALAN). Scientists are just beginning to understand the negative impacts that excessive nighttime light exposure can have on human health. The circadian clock, or 24-hour day/night cycle, affects important physiologic processes in almost all organisms. Disruption of these important biological processes are associated with sleep-wake disorders, psychiatric disorders, cardiovascular diseases, immunological disorders, metabolic disorders, obesity and cancer progression. Studies show that the circadian system is most sensitive to short wavelengths, such as blue-rich light emitted from LED lighting at night time.³¹

Light-emitting diode (LED) lighting is transforming the way we light our cities and towns while drastically improving how we use energy and light outdoor spaces at night. However, with these advances in technology comes an obligation to manage these changes responsibly and

sustainably.34



AMA GUIDANCE TO REDUCE LED STREET LIGHTING

Many communities are adopting LED lighting without an understanding of proper lighting design and engineering features. In June of 2016 the American Medical Association (AMA) released an official policy statement³² about street lighting: warm it and dim it. The AMA recognizes the detrimental human and environmental effects of blue-rich white light specifically related to high-intensity

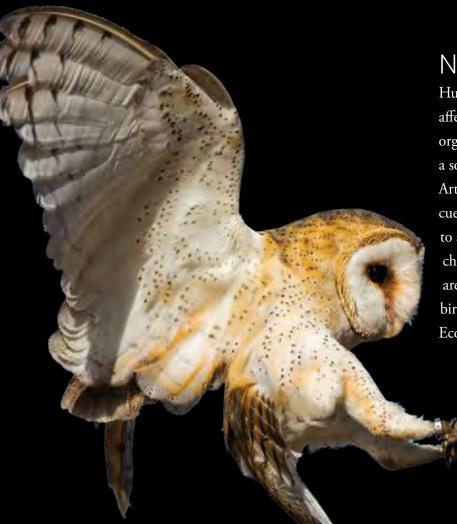
LED lighting design. In addition to its ill effects on human health, the blue light increases nighttime glare, discomfort and visual disability, and heightens safety concerns for drivers and pedestrians. The AMA encourages communities to limit blue light, use proper shielding to minimize glare, and to utilize the ability of LED lighting to be dimmed for off-peak time periods³³.



SAFETY

One of the main goals of night lighting is to increase safety, however, "bright" lighting does not necessarily mean "safer" lighting. Bright, glaring lights create sharp contrast between light and darkness, making the area outside of the illuminated area difficult to see. Sharp contrasts between light and darkness also create deep shadows that offer concealment. Additionally, nighttime glare from bright, blue-rich street lights heightens safety concerns, driver discomfort and visual impairment.

There is a strong tendency to light up property in the name of safety and security—especially in smaller towns. In fact, relative to their populations, small towns actually emit more light per capita than their urban counterparts. Most people believe that more, brighter light at night improves safety, but there is no scientific evidence to support this popular opinion.³⁵ The appropriate use of "dark-sky friendly" lighting will actually improve overall safety.³⁶ Lower lighting levels, warmer light temperatures, and better coverage are safer lighting methods.



NATURAL ECOSYSTEMS

Humans are not the only ones who are adversely affected by light pollution. Wildlife and other organisms use natural light as both a resource and a source of information about their environment.³⁷ Artificial light disrupts these natural processes and cues in both plants and animals. Prolonged exposure to artificial lighting prevents trees from adjusting to changing seasons and can alter behaviors, foraging areas, and breeding cycles for insects, turtles, birds, fish, reptiles and other wildlife species.³⁸ Ecosystems are complex networks of interacting

organisms; when one species is disturbed by light pollution, the chain of an entire habitat can be harmed.

Migrant birds, especially nocturnal migrants, are vulnerable to fatal light attraction to artificial lights. Nocturnal migrants naturally use constellations and

celestial cues as a way to guide their flight pattern but today's abundant artificial lights confuse the birds. Each year countless birds are being killed by either flying off course or colliding with buildings. Artificial lighting on the beach can fatally misguide baby sea turtles as they make their way back to the sea. Newly hatched turtles are naturally attracted to light, but when they are confused by artificial light emanating from nearby cities, they wander lost on the beach and are eaten by waiting predators.³⁹

"We are just now understanding the nocturnality of many creatures...

Not protecting the night will destroy the habitat of many animals."

Chad Moore, formerly of the National Park Service

REINDEER EYES Researchers in Norway and England have found that one part of a reindeer's eye changes color in winter in order to increase the sensitivity of the animal's vision. During the summer months the eye is a golden color, and during winter the eye color changes to blue. For Arctic reindeer living near the University of Tromsø in Norway, there is a third eye color possibility - green. Lighting from town and reflection of light off of clouds keeps the reindeer habitat dimly lit and never truly dark. As a result, the researchers believe, the eyes of these reindeer cannot shift fully to blue. 40 The disruption of natural processes and hormone levels in reindeer and other animals adversely affect their natural behaviors and leads to problems with natural hormone regulation, reproduction, adaptation and survival.

"The sky, our common and universal heritage, is an integral part of the environment perceived by humanity. Humankind has always observed the sky either to interpret it or to understand the physical laws that govern the universe. The interest in astronomy has had profound implications for science, philosophy, religion, culture and our general conception of the universe."

The United Nations Educational, Scientific and Cultural Organization, 2005



HERITAGE AND RURAL CHARACTER

Star gazing has been a human pastime since ancient times. The ancients interpreted constellations and arrangements of the stars and planets that they saw in the night sky to have important meaning for themselves and their families. Similarly, night skies were important to early settlers; that connection is an important part of Utah's pioneer heritage and rural character. As light pollution becomes more prevalent, the ability of humans to view and enjoy the night sky diminishes. This has subtle but significant cultural impacts, especially for future generations. 42 43

Rural communities recognize, appreciate, and want to preserve and protect their unique and beautiful night skies. The Utah Community Development Office recently assisted the Town of Leeds in conducting a community-wide survey, and without any prompting, several respondents mentioned dark skies specifically.

TOWN OF LEEDS SURVEY RESPONSES

Question A: What two things do you appreciate most about living in your community?

Responses:

- No street lights so I can see the night sky yay!
- Views by day and night sky
- The "quietness" and dark conditions in town that make the night sky very unique in a great way.
- See night stars/ lack of light pollution
- Peace and quiet, dark nights
- Low light pollution
- Dark skies / beautiful views

Question B: How do you think leadership and the community can best address the two things you would like to change?

Responses:

- Discourage excess lights (uplit homes) we want to see stars at night, not bright lights
- Lights! Use downward facing shields on all outdoor lights (dark skies initiative)

Question C: Please describe your desired future for your community in one sentence.

Response:

 Would like to see Silver Reef area west of freeway remain bedroom community with open space and see stars at night

Dark skies matter in Leeds and in many other communities throughout the state. However, an appreciation for the night sky is not enough to protect it; action must be taken. The following section discusses how to plan for dark skies, the International Dark Sky Places Program, and how to build momentum in your community.



Planning and community effort are essential to accomplish a sustained reduction of light pollution and conservation of the night sky.⁴⁴ Just as with other types of land use planning, planning for dark skies includes administrative code (the how) and zoning (the where).



OUTDOOR LIGHTING CODE

The principal purpose of most lighting regulation is to limit light pollution, promote energy conservation, regulate outdoor lighting fixtures, and to create a unifying, community-wide approach to outdoor lighting. The more effective your lighting code, the more successful your reduction of light pollution. Note that lighting codes can be enacted at different governmental levels—from state (most general), to county, or community and even down to a development project or neighborhood (most specific).⁴⁵

EFFECTIVE ORDINANCES INCLUDE⁴⁶

- Definitions
- Standards
- Exemptions
 - Procedures
 - Compliance methods
 - Enforcement
 - Actions in cases of violation

The IDA, in partnership with the Illuminating Engineering Society of North America (IES), jointly designed a Model Lighting Ordinance (MLO)⁴⁷ to address the need for strong, consistent outdoor lighting regulation in North America. An additional resource for model lighting code is the Pattern Outdoor Lighting Code v2.0⁴⁸ recommended by the Flagstaff Dark Sky Coalition. For good, general guidance and background for effectively tailoring a lighting code to meet local priorities, see the IDA Outdoor Lighting Code Handbook.⁴⁹



LIGHTING ZONES

Lighting zones define areas where general conditions related to lighting uses are sufficiently different to merit some differences in lighting standards in the lighting code. ⁵⁰ Lighting zones can be approached in three ways:

LAND-USE ZONING APPROACH Also referred to as Euclidean Zoning, the Land-use Zoning approach is based on the concept of single-use zones. With this approach, lighting code is tied closely to the different land-use zoning categories (such as heavy commercial or single-family detached residential).

RELATIONSHIP AND PROXIMITY APPROACH

Lighting zones can be based on relation to or proximity to a particular resource (such as an observatory or park. These kinds of overlay zones are also common around airports, though primarily for airport safety considerations).

combines the land-use zoning and relationship/ proximity approaches. Commercial zoning near an observatory would be considered one lighting zone, whereas in an urban surrounding the same commercial zoning would be considered a different lighting zone. defined as overlay zones. Overlay zoning is a regulatory tool that creates a special zoning district placed over an existing base zone(s) which identifies special provisions in addition to those in the underlying base zone.⁵¹ This means that the lighting zones "overlay" but are different from land-use zoning. This makes it easier to integrate lighting code into existing ordinances or codes and cross-reference to other applicable codes and ordinances such as electrical code, sign code or planning ordinances. After deciding upon an approach, the IDA recommends the use of five outdoor lighting zones for codes and ordinances.⁵³

LZ0: No ambient lighting—areas where the natural environment will be seriously of adversely affected.

LZ1: Low ambient lighting—areas where the natural environment might be adversely affected by lighting.

LZ2: Moderate ambient lighting—areas where lighting may typically be sued for safety, security and convenience but it is not necessarily uniform or continuous.

LZ3: Moderately high ambient lighting—areas where lighting is generally desired for safety, security and convenience and is usually uniform and continuous.

LZ4: High ambient lighting—Lighting is considered generally necessary for safety, security and convenience.

For greater detail on the five recommended lighting zones see the Joint IDA-IESNA Model Lighting Ordinance (MLO) User's Guide.

LIGHTING CODE ENFORCEMENT All code, including lighting code, requires enforcement. Lighting code enforcement is essential to achieving a sustained reduction of light pollution and conservation of the night sky. Communities should adopt an enforcement framework and strategy that outlines their intended means of enforcing the code. Enforcement methods vary significantly based on a community's size, resources, culture and needs. Enforcement strategies that match capacity and community culture will be most successful.⁵⁴

Typical lighting code enforcement may require:

- 1. Redirection of the luminaire
- 2. Shielding of the light source
- 3. Redesign or relocation of the luminaire
- 4. Replacement of the luminaire with a conforming luminaire
- 5. Removal of the luminaire
- 6. Penalties such as fines

"Regulation at the state level is necessary to ensure that minimum standards are met across the state. It is important to have these minimum standards, but it is also important to give local areas a chance to formulate their own additional rules and regulations."

Andrea L. Johnson



THE INTERNATIONAL DARK SKY PLACES PROGRAM

An important part of dark sky planning in the Intermountain West is the International Dark Sky Places Program. The Dark Sky Places Program was started in 2001 by the IDA to encourage parks and communities around the world to preserve and protect dark skies through responsible lighting policies and education. The International Dark Sky Places Program offers five types of designations.⁵⁵

- International Dark Sky Communities
 Communities are legally organized cities and towns that adopt quality outdoor lighting ordinances and undertake efforts to educate residents about the importance of dark skies.
- International Dark Sky Parks Parks are publicly or privately-owned spaces protected for natural conservation that implement good outdoor lighting and provide dark sky programs for visitors.
- 3. International Dark Sky Reserves Reserves consist of a dark "core" zone surrounded by a populated periphery where policy controls are enacted to protect the darkness of the core.

- 4. International Dark Sky Sanctuaries Sanctuaries are the most remote (and often darkest) places in the world, whose conservation states are most fragile.
- 5. Dark Sky Developments of Distinction
 Developments of Distinction
 recognize subdivisions, master planned
 communities and unincorporated neighborhoods
 and townships whose planning actively promotes
 a more natural night sky but does not qualify
 them for the International Dark Sky Community
 designation.

The International Dark Sky Places Program also offers independent, third-party certification under a transparent, no-fee based evaluation process.

For more information and how to apply visit: www.darksky.org/idsp/



Building momentum for local municipal policy initiatives requires action from leaders, citizens and other stakeholders. The following are actions taken by municipalities that have successfully limited light pollution and adopted dark sky policies and regulations.

HOW CAN WE BUILD MOMENTUM?

COMMIT Commitment means making dark sky preservation a priority and becoming actively involved.

EDUCATE AND SHARE INFORMATION

Without an understanding of why light pollution is a problem and what the benefits of preserving dark skies are, it can be difficult to gain community support. Educate leaders, planners, local governments and individuals about light pollution. Talk openly about the problem and address concerns.

PERFORM A DARK SKY ASSESSMENT

A dark sky assessment identifies problem areas and provides benchmarks for determining the effectiveness of lighting improvements and energy savings. For more information, tools and resources on performing an assessment visit www.ruralplanning.org/darksky_assessment.

SURVEY A survey is a great tool for gauging people's understanding about dark skies as well as their opinion. A survey can highlight common concerns, common questions and common values. Use a survey to gauge public interest and support.

CREATE AN ACTION PLAN You eat an elephant one bite at a time. Establish realistic goals and objectives and follow a timeline. Organization and collaboration are key.

DEMONSTRATE ENERGY COST SAVINGS

Calculating potential energy savings and payback for upgrade conversions is an effective way to gain support and to illustrate the benefits of energyefficient lighting.

FORM A SUPPORT GROUP Forming a dark sky coalition or interest group will unite stakeholders and community members and build support around shared goals. Involve the IDA, a dark sky interest group, or astronomy club and let them know of your efforts and goals. Talk to and involve your local energy provider. For a case study on the topic visit: darksky.org/how-to-start-a-local-dark-skies-group/

RAISE FUNDS Cost is a common barrier to local initiatives and planning efforts. Options include raising money through crowd-sourcing and promotion. Many organizations, institutes, student groups and government agencies are able to provide support and guidance for free or at a minimal cost. Your local energy provider may be willing to decrease rates on certain lighting types and help with lighting conversions.

ADOPT LIGHTING CODE AND DARK SKY BEST PRACTICES Lighting code establishes lighting design standards. The more effective your lighting code, the more successful your reduction of light pollution and sustained dark sky conservation.

ADOPT PROPER LIGHTING DESIGN

STANDARDS Replace or retrofit existing lighting so that it follows dark sky lighting basics. Talking to your local energy provider will be key to determining what is feasible and to create a plan. If funds are tight, work in phases by assigning priority to different areas, such as main street or public facilities. Lighting design standards will be an important part of your lighting code.

ENFORCE DARK SKY PROTECTION Develop a plan for enforcing lighting code and make provision for future updates and improvements to your code. Enforcement is key!

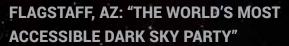
PROMOTE A "DARK-SKY" CULTURE AND

BRANDING Is you community known for something? If not, a dark sky designation presents an opportunity to create a unique brand and culture. A unique culture and brand can be the mechanisms that attracts new residents, visitors and businesses to an area.

THINK REGIONALLY, BUT ACT LOCALLY

Dark sky preservation is inherently a regional issue.

One municipality can make a significant difference,
but efforts to minimize light pollution will be far
more effective if regionalism is recognized and efforts
expand beyond one community's boundaries.



In 2001 the community of Flagstaff, AZ was awarded the first "International Dark Sky Community" designation by the International Dark sky Association (IDA). Flagstaff's efforts to protect dark skies go back to 1958 when the city banned advertising searchlights - enacting one of the world's first laws to protect night skies. Today, dimmed lights are an integral part of the city's culture. ⁵⁷

Each year the city hosts the annual "Flagstaff Star Party" which brings dark sky experiences to residents and visitors from across the Southwest and around the world. The Star Party's goal is to share the wonder of Flagstaff's dark skies with those who may not have the opportunity to view starry skies because of light pollution. Up to 30 telescopes are hosted by amateur and professional astronomers from the Flagstaff area for visitors to view the beauty and wonder of the night sky.⁵⁸

Flagstaff is divided into zones with specific lighting regulations for each zone. Regulations include requirements for maximum lumens per acre, shielded light fixtures, and even different classes of light. New businesses are required to comply with the city's lighting standards.



Utah leads the world with nine designated International Dark Sky Parks, one official International Dark Sky Community (Torrey - January 12, 2018), and 20 parks currently in the accreditation process, as well as several other communities. The number of Utah designations continues to grow as more parks and communities enter into the International Dark Sky Places Program.

DARK SKY PARKS IN UTAH

Cedar Breaks National Monument
Goblin Valley State Park
Canyonlands National Park
Capitol Reef National Park
Weber County North Fork Park
Natural Bridges National Monument
Hovenweep National Monument
Dead Horse Point State Park
Antelope Island State Park

DARK SKY COMMUNITY Torrey

PARKS IN THE ACCREDITATION PROCESS⁵⁶

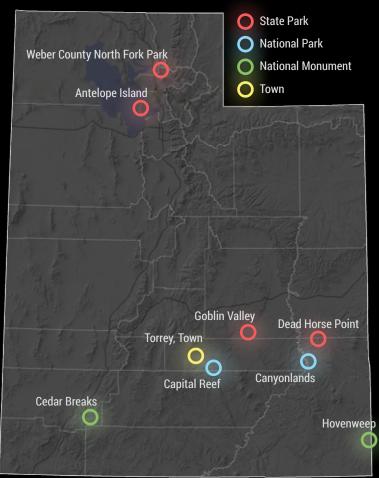
Bryce Canyon National Park
Zion National Park
Dinosaur National Monument
Grand Staircase-Escalante National Monument
Rainbow Bridge National Monument
Glen Canyon National Recreation Area
Bear Lake State Park
Coral Pink Sand Dunes State Park

Deer Creek State Park East Canyon State Park

Fremont Indian State Park

Goblin Valley State Park

Goosenecks State Park



Data Sources: National Park Service and International Dark Sky Association

Gunlock State Park
Jordanelle State Park
Red Fleet State Park
Rockport State Park
Steinaker State Park
Quail Creek State Park
North Fork Park

BRYCE CANYON - PARKS NEED PROGRAMS

A dark sky can be an important resource for a national or state park that is free from light pollution. Bryce Canyon National Park (BCNP) offers close to 59 different astronomy programs per year including solar observing, educational multimedia presentations in the evening, night sky viewing and full moon hikes. Visitors to the park can take part in any of these activities.

In a 2009 survey of BCNP visitors, 67 percent indicated that they learned about one or more park topics with 56 percent indicating that they learned about "night skies/astronomy." Of those who learned about night skies/astronomy, 21 indicated that their learning improved a lot and 38 percent indicated that their learning had improved somewhat. When asked to rate the importance of protecting park attributes and resources, 47 percent indicated "Dark, starry night sky" as important. 60

OGDEN VALLEY -GETTING AHEAD OF GROWTH

Ogden Valley is home to the Weber County North Fork International Dark Sky Park, which was designated in 2015. The Weber County North Fork Park is unique from other Dark Sky Parks due to its urban adjacency, intense focus on wildlife, extensive outreach program, and innovative public art exhibitions incorporating dark sky themes.⁶¹

Ogden Valley began protecting dark skies in 2000 when Weber County commissioners approved a lighting ordinance for the upper Ogden Valley. Today with growth projections of 20,000 new homes in the next 20 years, dark sky protection is a priority. By getting ahead of growth, Ogden Valley has been able to put protections in place that will preserve and protect their dark sky even when future growth and development occur.⁶²

TORREY - BECOMING A DARK SKY COMMUNITY

When her view of the stars surrounding Capitol Reef. National Park became obstructed by excessive artificial light, Torrey resident Mary Bedingfieldsmith found out what her small town could do to curb light pollution. Today, Torrey is Utah's first International Dark Sky Community.

In order to make a change, Bedingfieldsmith began talking to neighbors and met with town officials with a proposal. The proposal demonstrated how the municipality would save more than \$900 in lighting costs each year and how funds to install new lighting would be raised by Mary's group. By speaking to people on an individual level and assuring residents that no one would be forced to replace existing lighting, Mary was able to reach a consensus.⁶³

On March 15, 2017, ten old high pressure sodium street lights were replaced with new, warm-white LED lights that direct illumination onto the roadway rather than into the sky. True to Mary's proposal, friends and residents of Torrey were able to fund the replacements raising over \$18,000 via an online campaign.

"Torrey has proven its commitment to protecting this resource for the benefit of both its residents and national park visitors [visiting Capitol Reef National Park]."

IDA Executive Director J. Scott Feierabend

"When we talk individually, we can discuss specific lighting needs and what can be done to get there, Without individuals and associations working together, the last remaining dark areas on the planet could-well disappear without anyone noticing."

Mary Bedingfieldsmith

Garkane Energy and The Entrada Institute also played significant roles in the project. Garkane Energy decreased the rate renters pay for street and security lights that are switched to the new dark-sky friendly LED lights. In addition, Garkane Energy linemen spent many hours installing the new lights and taking down the old ones.⁶⁴

The Entrada Institute is an arts and education center with a goal of fostering community-based economic development in Wayne County and the surrounding region. Through the Institute's dark sky initiative, Torrey's project was promoted to members and patrons and an additional \$7,000 was raised.⁶⁵

On January 12, 2018 Torrey became Utah's first International Dark Sky Community. Torrey is also the first national park gateway community to earn the designation, according to the IDA. 66 In order to maintain its International Dark Sky Community status, Torrey must continue to preserve its night sky through education and awareness materials, dark sky events, exhibits and programs. 67

HELPER - TAKING INVENTORY

Helper, Utah is one of the first cities in the nation to have a thorough inventory of public light fixtures. With help from a team of University of Utah students and a representative from the Consortium for Dark Skies/Colorado Plateau Dark Sky Cooperative, Helper documented the number of public light fixtures, which lights are on all night, how high each street lamp and security light stands, and whether the light is fully shielded, partially shielded or unshielded. There is also information on available illumination levels and where each light falls on the visible light spectrum. Information collected during a lighting inventory provides benchmarks for determining the effectiveness of future lighting improvements and energy savings. Helper's thorough inventory will help the community monitor success and to know where improvements need to be made.⁶⁸

Many other communities and places throughout
Utah are making efforts to reduce light pollution
and protect the night sky, including Boulder, Eagle
Mountain, Virgin, Bryce Canyon City, Eden, Moab,
Rockville, Kanab, Heber City, Park City, Garden
City, Bluff and others. Even though efforts almost
always begin with a small group of individuals, those
efforts create a framework and a positive example for
other communities, states and countries to follow.

MOAB DARK SKIES Founded June 29, 2016, Moab Dark Skies is a group dedicated to promoting the appreciation and conservation of Moab's dark skies. The impetus for the group's formation was the desire to engage community support around the appeal for Arches National Park to receive the International Dark Sky Designation in 2018. Since then, activities facilitated by the group have become much more holistic.⁶⁹

Members of the Moab Dark Skies group recently performed an audit of publicly owned light fixtures in Moab. Based on findings, the City of Moab could save nearly \$16,000 per year by upgrading streetlights, exterior building lights, and shielding fixtures. Aside from labor costs, the return on investment time for this capital improvement project is estimated to be just over two years. The City Council has allocated funding in their 2018-2019 budget to make the recommended changes.⁷⁰

Today the Moab Dark Skies' goals are to: 71

- Maintain and preserve the dark skies in the Moab region.
- Encourage night-sky-friendly lighting for municipal, business and private use.
- Increase public awareness of the unique resource in Moab's dark skies.
- Provide dark sky educational opportunities and events for the community.
- Promote the economic benefits of astro-tourism in the local economy



The Utah Dark Sky Initiative is a collaborative group of stakeholders committed to promoting Dark Sky efforts in the state of Utah by: educating decision makers, community leaders, and the public about the value of dark skies, and by providing support for outreach, sky-quality monitoring, and lighting ordinance authorship to equip communities as stewards of Dark Sky preservation, restoration, and protection.

Initiative members include:

- The Utah Community Development Office
- The International Dark Sky Association
- Utah State Parks
- Utah Office of Tourism
- The Colorado Plateau Dark Sky Cooperative
- The Consortium for Dark Sky Studies
- Other committed agencies

Contact the Utah Community Development
Office for more information about the initiative,
how to become involved, and for additional dark
sky tools and resources: (801)436-0133 or info@
ruralplanning.org

The Initiative's objectives are:

Objective 1: Establish a statewide "dark-sky-network" between Initiative stakeholders in order to coordinate efforts, communicate effectively, share resources and information, and provide mutual support.

Objective 2: Increase awareness of light pollution's impacts by educating target audiences about the significant economic, human health, ecological, and safety benefits of preserving dark skies, as well as the cultural and heritage implications of restoring our citizens' access to starry nights.

Objective 3: Support and create actionable dark sky tools, guides, and resources.

Objective 4: Connect communities with the appropriate tools, resources, programs, and agencies based on their specific needs and goals.

Objective 5: Facilitate trainings and provide technical assistance, where feasible, to build the capacity of communities to build and enact their own dark-sky preservation plans.



"This symbol, composed of a hive of stars, transposes our beehive symbol to a new and grand level as we enter our second century as a group of people living in a place where we can still see, with our own eyes, the beautiful and dim features of the starry universe."

House Bill 140, 1996 72

In Utah, as in all places, how dim the stars become will depend on the value we place on dark sky protection. If reducing light pollution becomes a priority, municipal policy initiatives to protect the night sky will follow. Those initiatives will require community involvement, action and education in order to produce effective lighting plans. Proactively preserving and protecting dark skies gives Utah the opportunity to become the dark sky capital of the world.

The communities that recognize dark skies as a valuable resource understand the numerous benefits that come from dark sky protection, which include the conservation of energy, money savings, increased tourism, improved human health, safety and wellbeing, protection of ecosystems, and the preservation of Utah's culture and heritage. Fortunately, the decision to protect the night sky can be made today. This important decision will maintain "the beautiful and dim features of the starry universe" for us and the generations who follow.

"I want people to be able to see the wonder of the night sky without the effects of light pollution. The universe is our view into our past and our vision into the future. ... I want to help preserve its wonder."

Jennifer Barlow, Founder of International Dark Sky Week⁷³





THE INTERNATIONAL DARK SKY

ASSOCIATION (IDA) is the recognized authority on light pollution and is the leading organization combating light pollution worldwide. The IDA runs the International Dark Sky Places Program.

Contact:

(520) 293-3198

http://www.darksky.org

THE COLORADO PLATEAU DARK SKY

COOPERATIVE aims to voluntarily link communities, tribes, businesses, state agencies, federal agencies and citizens in a collaborative effort to celebrate the view of the cosmos, minimize the impact of outdoor lighting, and ultimately restore natural darkness the area.

Contact:

(435) 260-8540

https://cpdarkskies.org/ darkskycooperative@gmail.com

THE CONSORTIUM FOR DARK SKY STUDIES

was founded in 2015 at the University of Utah,
The Consortium for Dark Sky Studies (CDSS)
is dedicated to the discovery, development,
communication and application of knowledge across
a wide range of disciplines and professional fields
pertaining to the quality of night skies, growing
light pollution and the varied human, animal and
environmental responses to the "disappearing dark."
Contact:

(435) 260-8540

http://www.darkskystudies.org/ goldsmith@arch.utah.edu

THE NATIONAL PARK SERVICE

protects nighttime views and environments and other critical park features. Night sky protection enhances qualities of solitude and undeveloped wilderness character that animals depend on for survival, park visitors seek for connections, and many cultural-historical parks require for preservation. In this regard, the NPS recognizes a naturally dark night sky as more than a scenic canvas; it is part of a complex ecosystem that supports both natural and cultural resources.

Dead Horse Point State Park

Acting Park Manager, Crystal White crystalwhite@utah.gov or 435-259-2614

Steinaker State Park

Acting Park Manager, Joshua Hansen joshuahansen@utah.gov or 435-789-4432

Antelope Island State Park

Assistant Manager, Wendy Wilson wendywilson@utah.gov or 801-725-9263

Goblin Valley State Park

Assistant Manager, Nathan Martinez nathanmartinez@utah.gov or 435-275-4584

Jordanelle State Park

Park Manager, Laurie Backus lauriebackus@utah.gov or 435-649-9540

Fremont Indian State Park and Museum

Park Manager, Kevin Taylor kevintaylor@utah.gov or 435-527-4631

ACCESSIBILITY

Utah State Parks ADA Resource Coordinator jparsonbernstein@utah.gov or 801-538-7428

THE ENTRADA INSTITUTE serves the public as an arts and education center to promote public understanding and appreciation of the arts, the natural, historical, and traditional cultural heritage of the high desert Colorado Plateau, and to foster community-based economic development in Wayne County, Utah and the surrounding region. This nonprofit organization also supports artists, writers, scholars and scientists in their development of new works.

Contact:

info@entradainstitute.org http://www.entradainstitute.org/

UTAH'S COMMUNITY DEVELOPMENT

OFFICE (CDO) supports community development by facilitating coordination between stakeholders, delivering training and tools, and providing planning and technical assistance. The CDO's vision is resilient communities that are self-reliant, self-determined and prepared for the future. The CDO supports a state-wide dark sky initiative.

Contact:

(801) 438-0133

info@ruralplanning.org

http://ruralplanning.org/about.html



LIGHTING CODE, ORDINANCES, AND ZONING

Flagstaff Dark Skies Coalition - Outdoor Lighting Codes

Hub of information, resources, and links http://www.flagstaffdarkskies.org/dark-sky-solutions/dark-sky-solutions-2/outdoor-lighting-codes/

Pattern Outdoor Lighting Code (POLC) - 2010 Defines practical and effective measures by which the obtrusive aspects of outdoor light usage can be reduced, while preserving safety, security, and the nighttime use and enjoyment of property.

http://www.flagstaffdarkskies.org/WPdev/wp-content/uploads/2015/10/CBL-POLC-standard-v2.0.pdf

Modeling lighting ordinances - dark sky impacts

Analysis of the light pollution control effectiveness of the IDA-IES Model Lighting Ordinance and the IDA Pattern Outdoor Lighting Code

http://www.flagstaffdarkskies.org/model-lightingordinances-dark-sky-impacts/ Study found the POLC approach to be far more effective than the MLO in curbing the detrimental aspects of outdoor lighting.

IDA Lighting Code Handbook - 2002

This Handbook discusses issues relative to outdoor lighting codes, their effectiveness, implementation, and enforcement. http://www.flagstaffdarkskies.org/WPdev/wpcontent/uploads/2013/02/IDA-Outdoor-Lighting-Code-Handbook-Version-1.14.pdf

IDA Model Lighting Ordinance (MLO) - 2011

This Model Lighting Ordinance (MLO) is the result of extensive efforts by the International Dark Sky Association (IDA) and the Illuminating Engineering Society of North America (IES). Among its features is the use of lighting zones (LZO-4) which allow each governing body to vary the stringency of lighting restrictions according to the sensitivity of the area as well as accommodating community intent. http://www.darksky.org/wp-content/uploads/bsk-pdf-manager/16_MLO_FINAL_JUNE2011.PDF

IDA Recommended Lighting Zones
IDA suggested lighting zones for codes and

The MLO is best adopted as an "overlay zoning"

ordinances http://www.darksky.org/lighting/model-lightinglaws-policy/recommended-lighting-zones/

IDA - Lighting for Policy Makers

ordinance"

Arguments for why you municipality should be concerned about light pollution.

http://www.darksky.org/lighting/policy-makers/

LIGHTING CODE EXAMPLES

Flagstaff Outdoor Lighting Code

Example code from Flagstaff, AZ http://www.flagstaffdarkskies.org/WPdev/wpcontent/uploads/2014/11/Flagstaff.LC_2011.pdf

Eagle Mountain Lighting Code

Eagle Mountains Outdoor Lighting Standards http://www.codepublishing.com/UT/ EagleMountain/html/EagleMountain17/ EagleMountain1756.html

Torrey General Plan

General Goals (pg. 8): Land Use addresses the following areas of critical concern:private Land use, public Land use, municipal property, annexation,zoning,water usage,ordinances,town signage, trees, lighting, noise, animal control and the preservation of the aesthetic values of the town, such as the dark night sky and viewsheds.

Zoning (pg. 11): A commercial district should be established to encourage the central location of all businesses and preserve the residential community structure, including the reduction of sound and light pollution in areas away from the Town's core commercial area. The establishment of such district should also include definitions of appropriate commercial and industrial uses.

Preservation of Aesthetic Values, Noise and Light (pg. 15)

Appendix C - Analysis of 2013 Citizen Survey (pg. 33): There are aspects of life in Torrey we don't like. High on that list are bright, glaring lights. Fifteen respondents felt strongly enough about that to comment. The Saddlery was often cited specifically but also the "junction." Next on the "don't like" list are yards with junk and trash. Ten people mentioned that. Noise and dust from ATV traffic was the complaint of seven respondents and barking dogs were the complaint of six. Other complaints mentioned the wind and isolation from shopping and medical services.

http://www.torreyutah.gov/applications/ PlanningZoningGeneralPlan.pdf

Torrey Sign Ordinance

An ordinance providing for the construction and implementation of signs within the city limits of Torrey Town

http://www.torreyutah.gov/applications/tto/ SignOrd2015.pdf

Helper Municpal Code

Example lighting code.

http://www.codepublishing.com/UT/ Helper/?Helper18/Helper1820.html&?f

Springdale

Example lighting code.

https://www.springdaletown.com/AgendaCenter/ ViewFile/Agenda/_02012017-329?packet=true

Additional code examples

Telluride, Steamboat Springs, Springdale, Ogden Valley, Ketchum, Jackson, Breckenridge, and Aspen.

https://drive.google.com/ open?id=0B1CVKFshW7jPMzd5MXU5TUhpZ28

FINDING ENERGY EFFICIENT AND DARK SKY FRIENDLY LIGHTING

IES Standards

The IES is an accredited Standards Development Organization (SDO) that develops its standards using American National Standards Institute (ANSI) approved procedures.

https://www.ies.org/standards/

IDA - Find Dark Sky Friendly Lighting

IDA's Fixture Seal of Approval program certifies outdoor lighting fixtures as being Dark Sky Friendly, meaning that they minimize glare while reducing light trespass and skyglow. http://www.darksky.org/fsa/fsa-products/

IDA - LED Practical Guide

Considerations and tradeoffs for choosing LED products for outdoor lighting applications. http://www.darksky.org/lighting/led-guide/

DOE - Outdoor Area Lighting

This document reviews the major design and specification concerns for outdoor area lighting, and discusses the potential for LED luminaires to save energy while providing high quality lighting for outdoor areas.

https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/outdoor_area_lighting.pdf

DOE - Outdoor Lighting Resources

DOE offers a variety of resources to guide municipalities, utilities, and others in their evaluation of LED street lighting products. https://energy.gov/eere/ssl/outdoor-lightingresources

DOE - Toolkit: Outdoor Lighting

Includes an outdoor lighting decision tree tool, outdoor lighting challenges and solutions pathways report, OLA partner summary table, and lessons learned.

https://energy.gov/eere/slsc/downloads/toolkitoutdoor-lighting

DOE - Outdoor Lighting Accelerator Partner Summary Table

This is how they did it: pathways to energy savings with street lights.

https://betterbuildingssolutioncenter.energy.gov/outdoor-lighting/partner-summary-table

ADDITIONAL RESOURCES

DOE - Retrofit Financial Analysis Tool

Property owners, city and other government agencies, utilities, and energy efficiency organizations can use this tool to compute annualized energy and energy-cost savings, maintenance savings, greenhouse gas reductions, net present value, and simple payback associated with potential lighting upgrades.

https://energy.gov/eere/ssl/retrofit-financialanalysis-tool

Utah CDO Dark Sky Assessment Guide

The initial groundwork for a dark sky designation is establishing the current status. This worksheet guides users through several evaluation methods which could be used for a general assessment of dark-sky-friendly lighting. http://ruralplanning.org/assets/dark-sky-assessment-guide---web.pdf



CLUTTER Bright, confusing and excessive groupings of light sources.

COLOR SPECTRUM

Refers to the portion of the electromagnetic spectrum that is visible to the human eye.

DARK SKY Denoting or located in a place where the darkness of the night sky is relatively free of interference from artificial light.

FOOT CANDLE A uniform point source of light of one candle and equal to one lumen per square foot.

FULLY SHIELDED A fixture that allows no emission above a horizontal plane passing through the lowest light-emitting or light-reflecting part of the fixture.

GLARE Excessive brightness that causes visual discomfort.

KELVIN A measurement unit for light's "warmness" or "coolness."

LIGHT TRESPASS Light falling where it is not intended or needed.

LUMEN A measurement unit for the brightness from a light source.

LUMINAIRE A complete lighting unit that usually includes the fixture, ballasts, and lamps.

REFLECTION Light redirected back into the sky off of surfaces that are being illuminated.

SPECTRUM Referring to light it is the group of different colors (red, orange, yellow, green, blue, indigo, and violet) seen when light passes through a prism.

SKYGLOW Brightening of the night sky over inhabited areas.



IDA International Dark Sky Association

IES Illuminating Engineering Society

POLC Pattern Outdoor Lighting Code

MLO Model Lighting Ordinance

DOE Department of Energy

BUG Backlight-Uplight-Glare rating system for luminaires

LED Light-emitting diode

OLA Outdoor Lighting Accelerator



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Working toward a rural Utah that is self-reliant, self-determined, and prepared for the future.

For more resources, visit <u>ruralplanning.org/toolbox</u>

The Rural Planning Group is a program of the Housing and Community Development Division, part of the Utah Department of Workforce Services.

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Light pollution is reversible!

Unlike other types of pollution that are very difficult to remove from the environment, light pollution can be solved at the speed of light. Solutions deliver immediate and lasting results.



SUCCESS STORY

In 2018, the City of Tucson, Arizona, U.S.A. (population 500,000) upgraded its streetlights. By doing so, it saved \$2.2 million per year in energy costs and reduced light pollution by 7%.

WE'RE MAKING AN IMPACT

1.000+

More than 1,000 DarkSky Approved lighting fixtures are available on the market. 200+

More than 200 International Dark Sky Places have been certified, protecting over 160,000 sq km of dark places around the globe.



2,000+

DarkSky supports more than 2,000 volunteer Advocates in 49 countries.

70+

DarkSky supports more than 70 chapters in 24 countries.

The stars are disappearing.

Light pollution continues to grow at an alarming rate, harming our health, damaging the environment, and diminishing our view of the stars. DarkSky International has a plan to save the night, but we need your help.

Join the movement and help save the night.



DarkSky is a global community working together to save the night. Sign up today for DarkSky e-news updates to learn more.



Photo credit: Bin Chen



DarkSky International is a U.S.-based 501(c)(3) nonprofit that supports a global community and movement dedicated to preserving and protecting the natural nighttime environment.

DarkSky International 5049 East Broadway Blvd #105 Tucson AZ 85711 USA www.DarkSky.org +1-520-293-3198



What is light pollution?

Light pollution is the human-made alteration of outdoor light levels from those occurring naturally. When we over-light, fail to use timers and sensors, or use the wrong color of light, we negatively affect many parts of our world.



Learn more about light pollution -

Light pollution...

Destroys critical wildlife habitat



Plants and animals depend on Earth's daily light and dark cycle to govern life-sustaining behaviors. Research shows that artificial light at night has adverse and even deadly effects on many species.

Decreases safety and security



There is no clear scientific evidence that increased outdoor lighting deters crime. In fact, glare from unshielded streetlights can decrease personal safety, contributing to both crime and accidents.

Wastes energy and money



Most outdoor lighting is wasted. This energy waste increases greenhouse gas emissions contributing to climate change and wastes billions of dollars each year.

Robs us of our night sky heritage



Our ancestors experienced a night sky that inspired science, religion, philosophy, art, and literature. Now, millions of children across the globe will never know the wonder of seeing the Milky Way.

Harms human health



Studies indicate that artificial light at night negatively affects human health by increasing our risks for obesity, sleep disorders, depression, diabetes, breast cancer, and more.

Inhibits scientific research



Satellites in low Earth orbit create visible trails in the night sky, inhibiting astronomical research and jeopardizing NASA's early warning system for asteroid collisions.

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What can I do?

DarkSky's Five Principles for Responsible Outdoor Lighting can help you make smart choices to reduce light pollution. Do your lights protect the night?



Is it useful?

All light should have a clear purpose.
Use lighting only when and where it is needed.



Is it targeted?

Shield and aim your light so it only falls downward and where it is useful



Is it low-level?

Light should be no brighter than necessary to save money and reduce glare.



Is it controlled?

Lighting should only be on when needed. Use timers and motion sensors



Is it warm-colored?

Warm-colored light causes less skyglow. Use amber-toned lighting whenever possible.

Learn more



Visit darksky.org to learn more about the importance of the night and what you can do to reduce light pollution around your home and community.



Proposal for certification of Tasmanian Wilderness World Heritage Area as an International Dark Sky Sanctuary





Background



Dark Sky Tasmania is a chapter of the International Dark Sky Association.

Our purpose is to see Tasmania become a world leader in dark sky conservation and awareness.
Activities include advocacy, research and education through a program of dark sky events and outreach.

The island of Lutruwita is home to some of the world's most outstanding wilderness; existing under pristine skies, free from light and air pollution. It has been the home of Tasmanian Aboriginal people since the beginning of time. The care and protection of its lands, seas, waterways and skies has been the responsibility of Tasmanian Aboriginal people, a responsibility which remains with current and future generations to this day.

In more recent times, UNESCO World Heritage recognition has provided protection in the form of the Tasmanian Wilderness World Heritage Area Management Plan. However, this protection is predominantly written to safeguard the land, leaving this magnificent area under threat from the modern phenomena of light pollution. This presents a threat to the wildlife and ecosystems

that reside within the TWWHA and rely on the earth's natural light/ dark cycle for their survival. It also is eroding our pristine night skies, reducing our access to the stars and threatening the continuous connection Tasmanian Aboriginal people have to sky country.

Currently, Lutruwita/ Tasmania is a world leader in nature-based tourism. With one of the most accessible dark sky areas on earth, we have an opportunity to create and promote Tasmania as a dark sky destination while at the same time helping to protect what makes the TWWHA so special.

Promoting a natural dark sky is not only good for the environment and our cultural heritage, it offers a strong opportunity for our economy. It exemplifies a progressive, environmentally-aware, and health-conscious community that is consistent with Tasmania's brand and ethos.

Prepared by International Dark Sky Association Tasmanian Chapter (Dark Sky Tasmania). Supported and presented by Destination Southern Tasmania. Photos by Luke Tscharke.

Retaining our dark sky enhances what visitors and locals already love about our state.

Astro-tourism is one of the fastest-growing and most sustainable forms of visitation. Parts of North America and Canada, and more recently New Zealand, have invested in dark sky visitor experiences to access this growing market. Studies show that this not only benefits the environment, but has a direct impact on tourist numbers, providing significant economic benefit to those regions.

Designation of all or part of the TWWHA as a dark sky sanctuary by the International Dark Sky Association (IDA) would strengthen Lutruwita/ Tasmania's international reputation for pristine natural environments and deliver significant economic benefits to the state.

We recommend:

- The Tasmanian Government commit to a feasibility study to identify the pathway forward to create a Dark Sky Sanctuary.
- 2. The Tasmanian government commit to incrementally creating an IDA-designated dark sky sanctuary in the Tasmanian Wilderness World Heritage Area (TWWHA) to enhance the brand values of the state as well as stimulating economic growth from associated Astro Tourism and share its extraordinary access to the night sky.
- 3. As a first step towards this goal, the Tasmanian government commit resources necessary to obtain dark sky sanctuary status for the largest component of the TWWHA, the Southwest National Park.

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1 / What is a 'dark sky'?

"Dark sky" characterises a natural nocturnal environment, innately dark, enabling unobstructed views of the cosmos. The night sky, free from excessive artificial light pollution that often escapes our urban centers and creates a 'sky glow'. This illumination often washes out the night sky, diminishing our ability to observe celestial bodies and phenomena, thus, disconnecting us from a fundamental part of nature.

Dark sky communities, places, parks, and sanctuaries are areas recognised for their exceptional nocturnal environment quality. They are usually located far from urban centers, where anthropogenic light pollution is minimal, and thus the night sky visibility is extraordinary. The International Dark-Sky Association (IDA), the leading organisation in combating light pollution, classifies and designates these areas based on specific criteria that measure the darkness of the sky and the commitment to preserve it (IDA, 2021).

In recent decades, the term 'Dark Sky' has increasingly come into prominence, primarily due to the accelerating loss of night-time darkness. This loss is driven by the escalating use of artificial outdoor lighting and the advent of cheap lighting technologies such as Light Emitting Diodes (LEDs). A 2017 study published in "Science Advances" reported that artificially lit outdoor areas worldwide increased in radiance and extent by about 2% per year from 2012 to 2016, highlighting the rapidity of this issue (Falchi et al., 2017).

This increasing light pollution not only affects astronomical observations but also has profound effects on wildlife and human health, disrupting biological rhythms, and impacting overall ecosystem function (Gaston et al., 2013). Therefore, the concept of Dark Sky and its preservation is not just about reconnecting us with the cosmos; it is also about preserving the delicate balance of life on Earth.

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"Some people are looking for quietness and stillness, for a meaningful connection to nature and to others who care for nature. They are looking for Tasmania, even if they don't know it yet.

A Tasmanian Dark Sky Sanctuary will be enormously attractive to them, and international examples show they will pay for an experience they can only find here – a uniquely Tasmanian experience that makes a positive impact on them, on this place, and on the planet."

—Todd Babiak, CEO of Brand Tasmania



2 / Dark sky tourism opportunities

Dark sky tourism, also known as 'astro-tourism', is a growing subcategory of eco-tourism. It capitalises on the opportunity to experience pristine, natural night skies where the constellations and cosmic wonders are at their most resplendent. In conjunction with other nature-based experiences, dark sky tourism can significantly augment the visitor experience in Tasmania, offering a unique and deeply captivating adventure.

It is estimated that over 80% of the world's population now resides in urban areas where access to clear starlit skies is inhibited due to light pollution. Consequently, what was once primarily a scientific concern has increasingly resonated with a broader public. The yearning to reconnect with nature and the cosmos has stimulated a demand for 'dark sky experiences' in locations blessed with naturally dark night skies.

Evidence suggests that dedicated dark sky tourism programs present an array of advantages:

- 1. They represent one of the most sustainable forms of tourism, requiring minimal infrastructural development and causing little environmental disruption (Che, 2016).
- 2. They often encourage overnight stays, contributing significantly to local economies (Moss et al., 2014).
- 3. They can boost visitor numbers, especially during off-peak seasons, given that stargazing isn't seasonally dependent. In fact, winter sky viewing is often preferred due to longer periods of darkness and the visibility of certain celestial events (Falchi et al., 2016).

Internationally, governments are taking proactive steps to preserve and manage their dark skies. In the United States and Canada, state and federal authorities have actively pursued international certification of national parks, reserves, and other public lands as dark sky places. For instance, in the U.S. states of Arizona and Utah, dedicated dark sky tourism programs have been running for decades, attracting millions of tourists each year.

In the Asia-Pacific, New Zealand has realised the potential of dark sky tourism with its '100% Pure New Zealand' brand, thus actively pursuing the designation of their national parks as 'dark sky places' by the International Dark-Sky Association. With four dark sky places currently accredited, visitation numbers to these areas have reportedly surged by as much as 300%. The success of this program is evident in the fact that the International Dark Sky Reserve at Aoraki Mackenzie is currently assisting in establishing similar dark sky places in other national parks due to increased visitor demand.

Similar successful programs are found across the globe. For instance, the International Dark Sky Park at Galloway Forest Park, Scotland, has reported increased visitor numbers, with a direct return on investment of nearly 2:1. In Northumberland, England, their International Dark Sky Park has shown an increased visitor spend of over 8:1 against their investment.

These examples underscore the substantial potential for dark sky tourism to contribute to Tasmania's tourism offering. Such a commitment not only helps preserve our night skies but also offers a unique, immersive experience to visitors while bolstering the local economy.

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DARK SKY TOURISM PRODUCTS

Dark Sky sanctuaries and parks around the world have taken steps to develop tourism products that align with the Dark Sky opportunity.

- 1. Aoraki Mackenzie International Dark Sky
 Reserve, New Zealand: This area in New
 Zealand was declared an International Dark Sky
 Reserve in 2012. Several local tour operators,
 such as Earth & Sky, offer guided stargazing
 tours. They also offer astrophotography tours
 and workshops, where tourists can learn to
 capture stunning images of the night sky.
 www.earthandskynz.com
- 2. Atacama Desert, Chile: Recognised as one of the best places in the world for stargazing due to its high altitude, dry air, and lack of light pollution, the Atacama Desert has several tour companies that offer nighttime excursions. For example, SPACE (San Pedro de Atacama Celestial Explorations) provides professional astronomy tours with large telescopes. www.spaceobs.com

- 3. Kerry International Dark Sky Reserve,
 Ireland: This is the only Gold Tier Reserve in
 the Northern Hemisphere, and it offers multiple
 ways for visitors to enjoy the dark skies. Local
 businesses offer services such as "Star Sailing",
 which provides guided tours and workshops.
 www.kerrydarkskytourism.com
- 4. Cherry Springs State Park, USA: This park in Pennsylvania is one of the best places on the eastern seaboard for stargazing. They offer programs such as the Night Sky Tour, where a park ranger uses a laser pointer and telescopes to show constellations and other celestial bodies.

 www.dcnr.pa.gov/StateParks/FindAPark/CherrySpringsStatePark/Pages/default.aspx
- 5. Brecon Beacons National Park, Wales:

 This park offers many stargazing events and workshops, often in collaboration with local astronomical societies. There's also a "Dark Sky Discovery Site" at the National Park Visitor Centre, where you can stargaze independently.

 www.breconbeacons.org/stargazing

6. NamibRand Nature Reserve, Namibia: This reserve is one of only a handful of International Dark Sky Reserves in Africa. They offer unique accommodation options like the "Star Bed", which is an open-air bed on a raised platform for an unobstructed view of the stars.

www.namibrand.com

These examples illustrate some of the diverse range of tourism products that can be developed to leverage the Dark Sky opportunity. They include guided tours, workshops, special accommodation options, and collaborations with local astronomical societies.



TASMANIAN PRODUCTS

Although limited at the moment there is a growing interest in this area and especially pleasing is the boost to our Off Season offering.

- 1. McHenry's Distillery and Beaker Street:

 Through a successful grant program

 McHenry's distillery on the Tasman have
 developed Australia's newest and southernmost
 observatory and Dark Sky Event Hub on top of
 Mount Arthur at the site of the distillery.

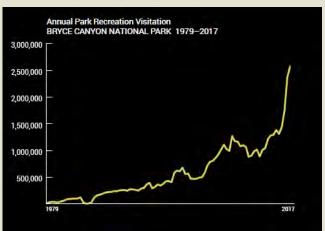
 www.beakerstreet.com.au/events/dinnerwhisky-stars
- 2. Walk on kunanyi: Hold an after dark tour

 walkonkunanyi.com.au/rezdy-items/southernstars
- 3. Freycinet Winter Light and Astro
 Photography Workshop: Luke O'Brien
 Photography tours and Tuition
 www.lukeobrien.com.au



"Having internationally recognised dark skies bolsters our ability to attract more visitors and offer more night programming which results in more people enjoying our parks at more times of the day."

-Fred Hayes, Utah State Parks Director



kunanyi after dark

3 / Dark sky benefits beyond tourism

As well as the benefits of tourism, and the associated economic win falls, dark skies have broad environmental, human health and cultural benefits..

These include:

Minimising the effects on human health due to overexposure to harmful light frequencies.

Overexposure to artificial light at night is a key factor in circadian disruption in humans. The imbalance of this natural rhythm is directly linked to health issues such as sleeping disorders, mental health issues, obesity, cardiovascular disease and even cancer. Studies have shown that the level of light pollution where you live is directly linked to increased risk in developing these associated health problems.

Saving energy due to unnecessary or inefficient lighting.

Artificial light at night is responsible for a large amount of our daily energy consumption, up to 20% on a given day. At the same time it is conservatively estimated that 30% of this light delivers no useful purpose, equating to a huge amount of wasted energy on a daily basis.

Reducing the disruption to wildlife and fauna.

Artificial light at night negatively impacts wildlife on many levels including disrupting biological triggers and affecting life history traits. Unintended implications such as reduced ability to navigate, decreased reproduction, increased predation, altered sleep patterns, etc. have resulted in serious and long term impacts on many species.

Preserving cultural and historical values associated with viewing the night sky.

Sky country has been an integral part of Palawa culture since the creation of time. The sky holds a wealth of knowledge that has helped shape daily life in almost every way. Through story, song and dance, valuable information is preserved in the skies around seasonal patterns and weather, navigation of the landscape, and the protection and care of the natural world. Knowledge on how to read the intricate map of the sky and landscape has been transferred over milennia by Aboriginal Ancestors, a tradition that continues to this day. Protection of dark skies enables this connection to culture to remain unbroken, helping ensure the continuation of Palawa culture.

A dark sky place would support Tasmania's image as a 'clean and green' place to live and visit, further support Tasmania as a leader in sustainability and provide recognition for Tasmania's diverse cultural and historical connections to the night sky.

4 / Tasmania: A dark sky sanctuary

Dark sky sanctuaries are the most remote (and often darkest) places in the world whose conservation state is most fragile.

The International Dark Sky Association (IDA) maintains an internationally-recognised 'dark sky places' program which certifies land areas as having grades of dark sky significance, similar to the UNESCO World Heritage Sites Program.

The program certifies places as either a sanctuary, park, reserve, place or community, and only 16 dark sky sanctuaries in the world, of which there are currently only 3 in our region:

- Aotea / Great Barrier Island (New Zealand)
- Rakiura / Stewart Island (New Zealand)
- The Jump-Up / Australian Age of Dinosaurs, Winton (Australia)

Tasmania is in the unique position of being home to the largest land area in the world suitable for a dark sky sanctuary — The Tasmanian Wilderness World Heritage Area (TWWHA).

The TWWHA would be extraordinary by international standards, achievable incrementally through certification of component parts. For example, the South West National Park and a number of southern Tasmanian communities meet dark sky place requirements.





5 / Brand values and promotion

OUR BRAND

Tasmania is a place where the uncommon is common. Where you can throw off the shackles and feel everything deeply. It is the antidote to the straitjacket of modern life. Tasmania is no ordinary place and Tasmanians are no ordinary people. It is a place that finds joy in non-conformity and our visitors can discover soul-enriching experiences that are raw, beautiful and honest. Come Down For Air is an invitation to get air in both a literal and metaphorical sense. It is about harnessing the power of place and our people, and creating a moment of calm for travellers.

Astro tourism and Dark Sky Sanctuary's align very closely with our current brand expression and we know that our current target market is looking for this experience.

TOURISM TASMANIA'S ASTRO TOURISM INFORMATION

Dark sky and aurora content consistently performs well above average through Tourism Tasmania's digital marketing programs.

Discover Tasmania social media

- Aurora content and stunning night photography (particularly in winter) is among our top performing social media content.
- The average post engagement can vary between 3.5-9k in likes; however, Aurora and Astro often far surpass that.
- Aurora content has seen between 12-19k likes every time it has been shared in 2023. Astro tourism is a little less, but still surpasses other generic travel content.

Discover Tasmania (DT) website

Figures from the past 12 months of data.

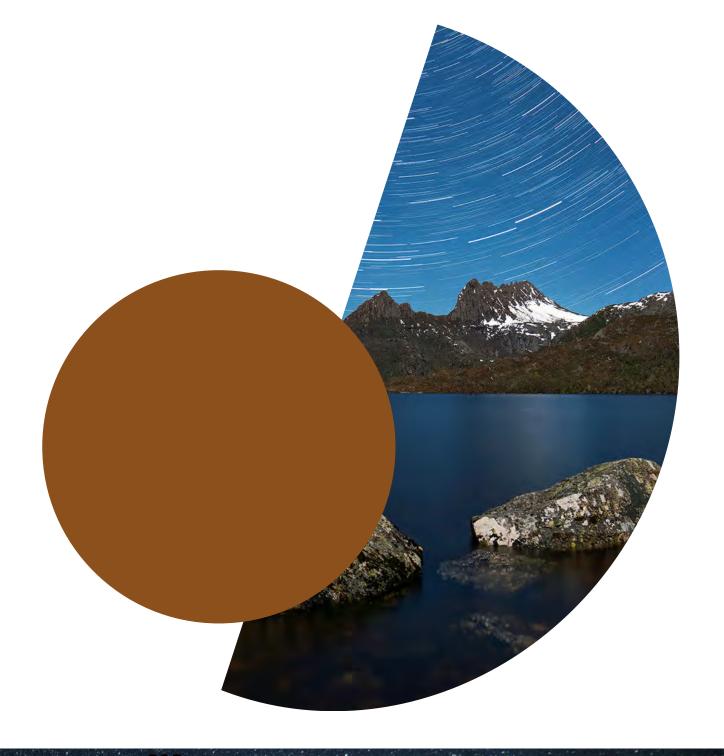
- DT performs very well for searches related to the southern lights/ aurora e.g Southern lights Hobart, *How to see the aurora*, *Aurora Tasmania*, *Aurora borealis*
- This has seen a spike over the past month (March 2023) (organic traffic up 22%), given the excellent conditions for viewing the aurora, but it remains a strong performer year round.
- Our article "How to see the Southern Lights" has driven the second most amount of organic search traffic (58,372 clicks), only behind the homepage 120,486. The popularity of this content type has been consistent for at least the last 5 years.

 $\underline{www.discovertasmania.com.au/experiences/}\\stories/southern-lights$

- There does appear to be some search demand.
 With queries related to 'dark sky' and
 'stargazing' on the rise in Australia

 https://trends.google.com/trends/explore?geo=AU&q=dark%20
 sky,stargazing&hl=en
- There also appears to be a plenty of questions and propositions which content and experiences could be built around.
 https://answerthepublic.com/reports/ecb83f4d-705e-4dd7-a279-28f01cdc59ae

Cumulatively this indicates that there is strong consumer interest in this area.



6 / The investment

A dark sky sanctuary is achievable for Tasmania if the following requirements are met:

- A comprehensive Lighting Management Plan (LMP), endorsed by the IDA, must be implemented;
- At least 67% of existing outdoor lighting must conform to the requirements of the LMP, and 90% of all lighting within 5 years of designation;
- Meet minimum IDA sky quality standards at certification, and undertake a sky brightness measurement program to ensure the night sky quality does not degrade over time;
- Dark skies to be acknowledged as an important resource value by recognition in official government documents; and
- Signage is to be installed and maintained at an entrance to the sanctuary.

A sanctuary can only be pursued with the support of the site's owner managing agency. Given that the TWWHA includes multiple land owners, a two-stage approach to certification, starting with a single-owner area within the TWWHA could generate sanctuary status quickly and encourage other land-owners to come on board.

The Southwest National Park, owned by the Crown and managed through the Tasmania Parks and Wildlife Service, is potentially suitable as a standalone sanctuary within the TWWHA.



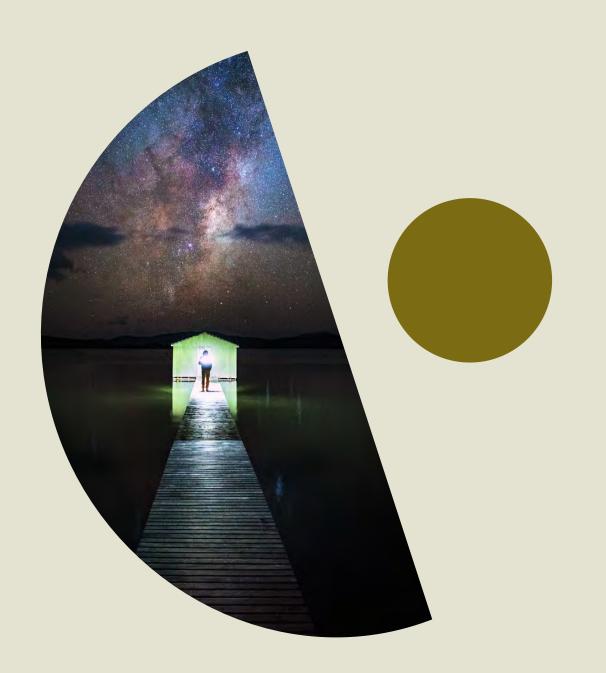
Using the Southwest National Park as an example, estimated certification costs are as follows:

ESTABLISHMENT

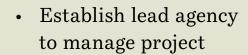
TOTAL	\$750,000
Creation of signage and interpretation	\$50,000
Upgrade of non-compliant lighting	\$500,000
Creation of lighting management plan	\$20,000
Lighting audit	\$80,000
Initial sky brightness survey	\$100,000

ONGOING

TOTAL	\$200,000 pa
Annual event/comms	\$50,000 pa
Annual report and survey	\$150,000 pa



7 / Next steps

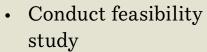




• Consult with stakeholders



• Decide on target area within TWWHA





• Secure funding



8 / Further reading

- The Sky and Sustainable Tourism
 Development: A Case Study of a Dark Sky
 Reserve Implementation in Alqueva.
 Aurea L. O. Rodrigues, Apolónia Rodrigues
 and Deidre M. Peroff.
- Estimating the Potential Economic Value of the Night Skies Above the Colorado Plateau. Mitchell and Gallaway. 2016. Missouri State University.
- 2016 National Park Visitor Spending Effects: Economic contributions to local communities, states, and the nation. Cullinane Thomas, C., and L. Koontz. 2017. Natural Resource Report NPS/NRSS/EQD/NRR—2017/1421. National Park Service, Fort Collins, Colorado, USA
- "Astronomical Tourism": The Astronomy and Dark Sky Program at Bryce Canyon National Park. Fredrick M. Collison, Kevin Poe. 2013.
- 5. Destination South Tasmania, Destination Management Plan
- 6. Informing TWA's dark sky tourism products and strategies, Tourism Western Australia, March 2021

To find out more about creating Tasmania's dark sky sanctuary contact us:

Dark Sky Tasmania info@darkskytasmania.org www.darkskytasmania.org 34 Federal St, North Hobart TAS 7000 Ph 03 6231 5599







CENTRAL HIGHLANDS COUNCIL COMMUNTY GRANTS PROGRAM APPLICATION FORM

Please ensure you have read and understand the Program Guidelines prior to completing this form. Please enclose your group/club's current financial statement.

1. APPLICATION & ORGANISATION DETAILS

Name of Project: State Firefighter Championships

Amount of Grant Requested: \$1700

Estimated Total Project Cost: \$2610

Applicant Organisation: Gretna Volunteer Fire Brigade

Contact Person's Name: Colin Cunningham AFSM

Contact Addres

Phone: (Business hours)

Mobi

Fax:

Em:

Signature: Colin Cunningham

Name

Position in Organisation Brigade Chief

Date 07/09/2025

What is the overall aim/purpose of the applying organisation? To protect life, property and the environment in the Brigade area & the Wider community

What is the membership of the organisation?

President/Brigade Chief Colin Cunningham AFSM

Secretary Jocelyn Dunk

Treasurer Connor Gittus

2. ELIGIBILITY (see Community Grant Program Guidelines)
Is the organisation: √ Representative of the interests of the Central Highlands Community □ Incorporated √ Not for Profit □ Unincorporated □ A Hall Committee
OR □ An individual community member
Have you previously received funding from the Central Highlands Council? (Please attached additional pages if required)
If yes; Name of Project: Gretna Brigade Junior Soft Shell Jackets x 10 Date Grant received: 20/01/2024 Amount of Grant: \$750
3. PROJECT DETAILS
Project Start Date: 12/08/25 Members commenced weekly training
Project Completion Date: 09/11/25 Day 2 of State Firefighting Championships
Project Objectives: To assist in maintaining Senior member firefighting skills and train and develop Junior members in all aspects of firefighting in readiness to become active volunteer firefighters in the Gretna Brigade or adjoining areas
4. COMMUNITY SUPPORT
What level of community support is there for this project? – Brigade members are appreciated and commended for their commitment and response to all the incidents & community events we attend

Does the project involve the community in the delivery of the project? No not directly but all 17 members are resident in the local community And have a wide interaction within the Community whilst attending incidents & promoting fire Safety and awareness

How will the project benefit the community or provide a community Resource?

Participation by members of the Brigade will enhance personal skills and help maintain an effective response to all incidents In the Central Highlands Community

5. COUNCIL SUPPORT

Are you requesting other Council support? E.g. parks, halls, telephones, fax, photocopying, computers, office accommodation, cleaning facilities, street closure.

If yes, please give details.

No

Are you requesting participation by Councillors or Council Staff? If yes, please give details.

No

If your application is successful, how do you plan to acknowledge: Recognition of grant in the Highland Digest & New Norfolk & Derwent Valley News

Brigade members will promote the Council by wearing embroidered polo tops at the Championships – these were purchased compliments of A Council grant over 8 years ago and still in excellent condition.

6. FUTURE APPLICATIONS AND THE SUCCESS THIS PROJECT

Do you anticipate the organisation will apply for funding in future years?

Yes , the Gretna Brigade is very appreciative of support from CHC in past Years and no doubt will apply for future grants when the need arises And grant opportunities exist How will you monitor/evaluate the success of this project?

Hopefully through the competing teams learnings & results, but also the opportunity to work together in a team environment which Can only enable Brigade members to serve the community With professional incident response.

7. PROJECT BUDGET

Note: Amount from Council must not exceed half the project cost

Please provide a breakdown of the project expenditure and income:				
Expenditure	Amount \$	Income	Amount \$	
Capital		Guarantee		
Refurbishment		Government Grants		
Equipment		Trust/Foundations		
Premises		Donations from Business		
Vehicles		Special Funding		
Other:		Gifts in Kind		
Other:		Other:		
Subtotal		Other		
		Subtotal		
Revenue		Anticipated		
Salaries (including super)		Government Grants		
Short-term contract fees		Central Highlands Grant	1700	
Running costs	625	Trust/Foundations		
Production of information PR materials		Donations from Businesses		
Training staff/volunteers		Special Fundraising	500	
Travel - Fuel to collect and return TFS bus & Car wash and vacuum expense	100	Gifts in kind (details)		
Rent 6 Cabins for 2 nights	1650	Cash Reserves	410	
Reference materials		Other:		
Other:	235			
Subtotal	2610	Subtotal	2610	
TOTAL	2610	TOTAL	2610	



AFL Masters Tasmania

Address: PO Box 275, Ulverstone TAS 7315 **Email**: aflmtas.secretary@gmail.com **Website**:

https://aflmasterstasmania.teamapp.com

2nd July 2025

Ms Kristy Mayne (Worker)

To Whom It May Concern

AFL MASTERS FOOTBALL CARNIVAL DARWIN 2025

This letter confirms that Kristy Mayne (Worker) has been selected to play for one of our teams representing Tasmania at our upcoming National AFL Masters Football Carnival in Darwin.

Kristy will be playing for our Women's team at the Carnival, held in Darwin, Northern Territory, from 27th September to 4th October inclusive.

We congratulate Kristy on her selection to play in our Women's team and wish her every success at the Carnival.

Yours sincerely

Rebecca Stewart

Admin Assistant

AFL Masters Tasmania

Major sponsors of AFL Masters Tasmania:











CENTRAL HIGHLANDS COUNCIL COMMUNTY DONATIONS PROGRAM APPLICATION FORM

Please ensure you have read and understand the Program Guidelines prior to completing this form.

1. APPLICANT DETAILS			
Applicant's Name : Kristy Worker (Mayne)			
Contact Details Residential Address: 3 Arthur Crescent Bothwell			
Phone: (Business hours)			
Mobile:			
Fax:			
Email:			
Signature _{KMayne}			
Amount Applied for \$1000- (Maximum as per Guidelines)			
2. INTERSTATE OR INTERNATIONAL REPRESENTATION			
Where are you competing/attending? Darwin			
What sport/activity are you competing in, and at what level? Representing Tasmania in the women's over 40 AFL If you are a sports competitor, are you competing as an amateur?			
What dates are you competing/participating?			
September 26th- 6th October 2025			

Please provide details to support your application	
Please see attached letter of confirmation, i understand that the maximum amount is \$500- however would like to express if possible to be considered for a higher amount, this is the 2nd year i have been lucky enough to have been chosen to represent our state and community on a national level, this year it is being held in Darwin, this is expensive exercise and i really had to consider if this something i could do financially however having support form council will make this thank you for considering my application. I have been a resident of Bothwell for 23years.	possible
3. MEDICAL ASSISTANCE	
What type of medical/rehabilitation treatment will you be receiving?	
Where will the treatment be administered?	
Please provide any additional information to support your request.	



CENTRAL HIGHLANDS COUNCIL COMMUNTY GRANTS PROGRAM APPLICATION FORM

Please ensure you have read and understand the Program Guidelines prior to completing this form. Please enclose your group/club's current financial statement.

1. APPLICATION & ORGANISATION DETAILS	
Name of Project:	
Amount of Grant Requested:	
Estimated Total Project Cost:	
Applicant Organisation: Bothwell Oricket Club	
Contact Person's Name: Traci Millhouse	
Contact Details Address	
Phone: (Business hours) Mobile:	
ax:	
mail:	
gnature	
ame Traci Millhouse osition in Organisation Socretory ite 17.9.25	
nat is the overall aim/purpose of the applying organisation?	
at is the membership of the organisation?	

President Secretary

Treasurer

Public Officer/s

2. ELIGIBILITY (see Community Grant Program Guidelines) Is the organisation: Representative of the interests of the Central Highlands Community **≥**Incorporated □ Not for Profit □ Unincorporated ☐ A Hall Committee OR □ An individual community member Have you previously received funding from the Central Highlands Council? (Please attached additional pages if required) If yes; Name of Project: Date Grant received: A - The second of the second o Amount of Grant: 3. PROJECT DETAILS Project Start Date: 8th November 2025 9-10 am Project Completion Date: 13+h December 2025

Project Objectives: To give Children their first experience of Cricket in a fun and accessible way.
To provide a positive environment where kids can make new friends and experience being on a team.

4. COMMUNITY SUPPORT

What level of community support is there for this project?
The local School is giving full support for the Program. The local sporting clubs are fully committed aswell.

Does the project involve the community in the delivery of the project?

The Bothwell Buck Cricket Club will deliver the project. The project will also involve parents and family members which allows them to spend time with their Children learning new skills together How will the project benefit the community or provide a community resource? This is the first time this type of Program has been provided in Bothwell. Hopefully it might encourage children to want to play a sport.

I'm even hopeing that some Parents get together to Rorm a Juniour team in the foture

5. COUNCIL SUPPORT

Are you requesting other Council support? E.g. parks, halls, telephones, fax, photocopying, computers, office accommodation, cleaning facilities, street closure.

If yes, please give details.

Are you requesting participation by Councillors or Council Staff? If yes, please give details.

If your application is successful, how do you plan to acknowledge Council's contribution?

Twe Will acknowledge the Council on Our Social Media Pages.

6. FUTURE APPLICATIONS AND THE SUCCESS THIS PROJECT

Do you anticipate the organisation will apply for funding in future years?

218

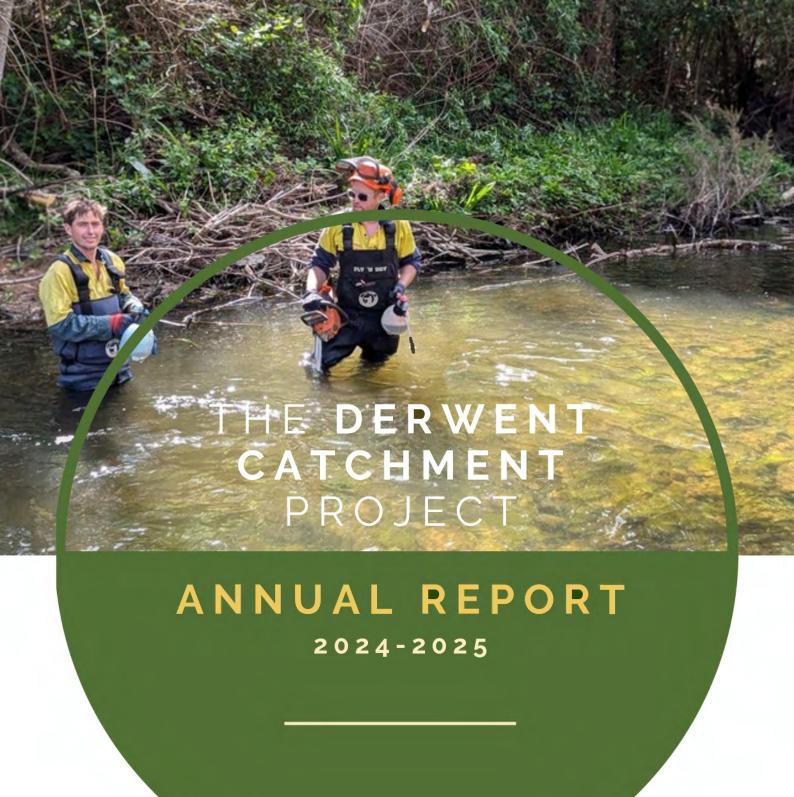
How will you monitor/evaluate the success of this project?

I hope we have a high participant rate that leads to children playing cricket and may be a Junior toom.

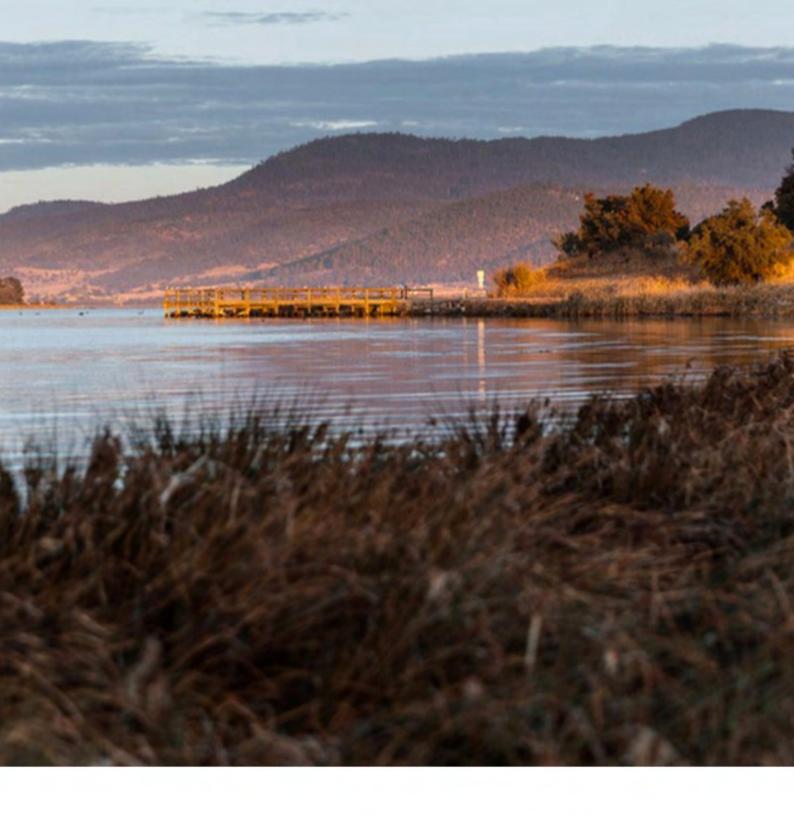
7. PROJECT BUDGET

Note: Amount from Council must not exceed half the project cost

Expenditure	Amount \$	Income	Amount \$
Capital		Guarantee	11 13 42
Refurbishment		Government Grants	
Equipment		Trust/Foundations	
Premises		Donations from Business	
Vehicles		Special Funding	
Other:		Gifts in Kind	
Other:	\$49 Perchild	Other:	
Subtotal	#49 Pechild	Other	
		Subtotal	
evenue		Anticipated	
alaries (including uper)		Government Grants	
nort-term contract fees		Central Highlands Grant	
unning costs		Trust/Foundations	
oduction of		Donations from	
ormation R materials		Businesses	
aining staff/volunteers		Special Fundraising	
ivel		Gifts in kind (details)	
t		Cash Reserves	
erence materials		Other:	
31:			
total		Subtotal	
AL	349.00	TOTAL	







WE ACKNOWLEDGE THE TASMANIAN
ABORIGINAL PEOPLE AS THE
TRADITIONAL CUSTODIANS OF
LUTRUWITA (TASMANIA), AND THEIR
ONGOING CONNECTION TO THE LAND AND
WATERS ON WHICH WE WORK.



Annual Report 2024-25 Contents

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PRESIDENT'S REPORT

Over the past year, DCP has made significant progress in addressing one of our long-standing challenges: securing sustainable core funding. I am pleased to report that, through the support of the newly elected Federal Member for Lyons, Rebecca White, and the Australian Government, DCP now has a multi-year funding commitment. The announcement of \$10 million for a Nature Repair Plan pilot, together with the upcoming Clyde River Restoration Project, provides a strong financial foundation for our operations over the coming three years and gives us the stability needed to plan with confidence.

Since joining the DCP Executive three years ago, two priorities have guided our work: securing reliable funding to ensure continuity of on-ground action and strengthening our governance and management structures to meet the demands of an increasingly complex program of work.

Concepts such as nature repair, nature positive, and biodiversity credits are now commonplace in public discourse, but practical implementation has been limited. DCP is well placed to lead in this space.

Our intention is to use federal funding to design and deliver investable nature and biodiversity projects that deliver measurable environmental outcomes, strengthen local industries, and benefit communities throughout the Derwent catchment. A key ambition is to attract private sector coinvestment, amplifying the impact of public funds.

We remain mindful that these funds represent a public trust. Our case to government has consistently highlighted DCP's proven record of delivering tangible, on-ground results. This recognition by Rebecca White and her team is a testament to the decade-long efforts of our staff, partners, and volunteers. I extend my thanks to all who contributed to building this reputation.

Our achievements also reflect the commitment of our many partners, and we again thank and recognise the input of the Central Highlands Council, Derwent Valley Council and Brighton Councils who contribute annual facilitation and project funds to the DCP. This has been a successful and strategically important year for DCP, one that positions us strongly for the future.



EXECUTIVE REPORT

It's been a very exciting year with lots of great wins on the ground and in the office. We are obviously very excited to have the 10 million dollar election commitment from Labour for nature repair. The Nature Repair Plan and Program allows us to consolidate many years of work and expand key programs to ensure a catchment wide improvement in landscape health.

Rivers are a key focus of activities as the arteries in the landscape. This year we have wrapped up the Lachlan River Recovery grant and had some very positive feedback from the community.

The catchment program partnership grew with TasNetworks becoming a formal partner. Whilst this was a long-term relationship the shift from delivering fee for service to more broader support is exciting as it allows us to delivery a broader range of programs. Hydro are also now contributing to project facilitation. This is critical support to coordinate, design and manage the programs to provide an holistic approach to catchment management.

We also kicked off a four year program partnering with NRM South for the delivery of a climate smart ag program working with farmers to build long-term sustainability in a changing environment.

One of the more heart-warming events I attended this year was the project wrap up of the Connecting to Land and Sea Program for Aboriginal ranger training. This program was run in partnership Luke Mabb and supported by the Southcentral Workforce Network. It was so great to see the participants grow and give their honest and heartfelt thanks for the program and in finding an increased connection to country. Well done to all those involved.

On a more administrative front we achieved tax deductible gift recipient status (DGR) which means we can now attract tax deductible donations and apply for grants through funding bodies which specialise in supporting charities like the Ian Potter Foundation.

Thank you as always to our committee members, supporters and the DCP team for helping us move closer to our vision of a resilient, healthy and productive Derwent Catchment.



TRIBUTE PAGE 06



We pay tribute to Melanie Jane Kelly and her conservation detection dog, Fonz, whose dedication and skill made a lasting contribution to weed management. Mel's passion for natural resource management and her special bond with Fonz inspired all who worked with them. Their passing is deeply felt, and they will be remembered with respect and affection as a remarkable duo whose legacy will continue to inspire.

To honour Mel's legacy, the Mel K Bursary Fund supports women in conservation by providing financial assistance for education and action. Every donation, no matter the size, makes a difference.





"Our vision is to be recognised for creating positive landscape change and building climate resilience. We see a strong, thriving community and economy supported by a healthy environment".





Achievements at a glance



1,472,129Dollars attracted



15,901 Weeds killed



3161 km of road monitored and treated



14,000m of river restored



62 Farmers engaged



28Active projects



14 Volunteer working bees



14Community
events / workshops



80 DCP volunteers



54,051Social media accounts reached



25,000 Plants sold



31,000 Plants grown



Investment Source

Investment by Program

Australian Gov \$695,394 Local Gov \$314,000 Fee for Service \$245,175 State Gov \$165,020 Industry \$28,640 NGO \$23,900 <u>Total</u> \$1,472,129

River Restoration & Revegetation \$613,640 Weed Management \$374,000 Facilitation & Engagement \$270,000 **18**% **Best Practice Farming** \$139,294 9.5%





TasNetworks partnership

After several years of working together, TasNetworks has formally joined the collaborative catchment program providing an ongoing commitment of \$80,000 per year. Over the past year, TasNetworks supported on-ground works at 16 high-value sites across the catchment, with DCP staff delivering targeted weed control, revegetation, and restoration activities. This work has reduced the weed burden, improved biodiversity, and built resilience to climate-driven threats such as bushfire and flood.

The collaboration ensures on going cross-tenure relationships with councils, landholders, and industry partners. This ongoing annual investment will allow the DCP deliver expanded programs in weed and river management, community education, and ecological restoration across the catchment.





BEST PRACTICE FARMING

Climate Smart Agriculture - supported by the Australian Government

The Climate Smart Farming Project is a four-year initiative helping build resilience in Southern Tasmania's farming systems. Led by Peter Ball in collaboration with NRM South, it supports producers to trial and adopt practices that balance productivity with long-term sustainability. This project is an extension of our Derwent Pasture Network, working with landholders on practical, science-based management tools to adapt to an increasingly variable climate.

Building the foundations - In just five months, the first year reviewed Derwent Pasture Network trials, engaged producers, and identified top climate adaptation priorities. A detailed survey mapped current farm practices and knowledge gaps, guiding future extension content and trial design.

Farmer voices - Interviews and a baseline report reinforced the value of paddock-based learning and highlighted the need for more resilient grazing systems.

Growing engagement - Farmer participation has been strong, with events including a standout integrated pest management workshop led by entomologists Paul Horne and Rebecca Addison.

Next steps - Future focus areas include boosting legume persistence, perennial grass vigour, and rooting depth to build long-term pasture system resilience.



Carbon Farming Outreach Program - supported by the Australian Government

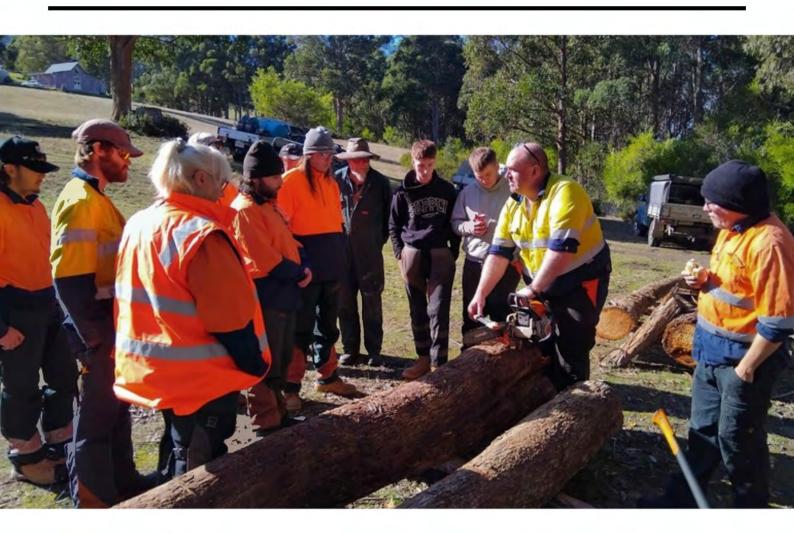
In June, we hosted a Carbon Farming Outreach Program workshop at the Hamilton Resource Centre, which drew strong attendance and lively discussion.

The session focused on the increasing requirements for greenhouse gas (GHG) emissions reporting, now flowing from global and national frameworks down to industry and business. We presented case study data outlining average on-farm GHG sources, compared the available carbon calculators and their relative strengths, setting baselines and the advantages of developing an emissions reduction strategy.

We also shared an overview of carbon farming opportunities in the region, including eligibility, indicative costs, and potential benefits for landholders considering carbon offset projects. The workshop concluded with an introduction to emerging nature and biodiversity markets, including the Australian Government's Nature Repair Bill, and provided practical examples of pathways to market.







Connecting to Land and Sea program - supported by the Tasmanian Government

The Connecting to Land & Sea project offered Aboriginal participants skills and experience in conservation, land management, and landscape restoration. Developed in collaboration with the Southcentral Workforce Network, the eight-week program involved eight participants, with an emphasis on cultural landscapes and supporting Aboriginal participation in land management.

Led in partnership with Luke Mabb, an Aboriginal man and advocate for cultural connection, land-based healing, and youth empowerment, the program combined traditional knowledge with modern practices. Luke, alongside DCP's John Chaplin, provided on-ground support, mentoring, and guidance in Healthy Country principles. Training covered cultural awareness, chainsaw operation, brush-cutting, first aid, chemical handling, white card accreditation, communication and conflict resolution, paired with practical fieldwork.

Participants put their skills into practice through activities including river repair on the Tyenna River, healing Country at Green Point, weed control near the Jordan Nature Reserve, plant propagation at DCP's Hamilton Nursery, and cultural burn practice at Murrayfield. The program aimed at building confidence, technical competencies, and giving participants a strong foundation for ongoing work in land and waterway management.



RIVER RESTORATION



Lachlan River Recovery - supported by the Australian Government's Preparing Australian Communities Grant

This project was delivered in partnership with the Derwent Valley Council (DVC) and the 3 year grant program and funding came to a close at June 30. With the support of the DVC we will continue to ensure long-term outcomes are maintained into the future. This project marks a significant step forward in improving the health of the Lachlan River. Over the life of the project, 5500 native plants were established and 109 landholders collaborated to deliver a whole of river program. Thanks to all the community members involved for making the project a success.

When major flooding occurred in September 2024, the benefits of the project were clear. Willow removal, debris management, and erosion control measures all contributed to improved flood resilience and reduced damage along the river.

This project stands as a strong example of practical, collaborative investment, delivering measurable environmental outcomes while building enduring relationships with landholders. Its success positions it well to be carried forward as a flagship initiative under the upcoming Nature Repair Plan Pilot.

A short video celebrating the project and its outcomes can be viewed on the Derwent Catchment Project YouTube channel: https://www.youtube.com/watch?v=tLGG3wE6tG0.



Tyenna River Recovery and the Willow Warriors - supported by Inland Fisheries Service, Lenah Estate & Tassal

The Tyenna River Restoration Program, guided by a 10-year plan (developed in 2020 with Fisheries Habitat Improvement Fund support), continues to manage willows on the river with local volunteer and landholder support. The focus of the work included clearing woody debris, planting 1,500+ natives along a degraded 2 km reach, and controlling foxglove and Californian thistle.

The Willow Warriors ran multiple working bees, treating willows downstream of TASSAL, under the TasWater pipeline, and on private land. Flood risk reduction works included storm-damaged willow removal near Westerway and clearing a major log jam near Mt Field with TasRail support.

The program continues to show how partnerships and volunteers can drive catchment-scale restoration.



Sorell Creek and Glen Dhu Rivulet river restoration – supported by the Australian Government's Disaster Ready Fund

Delivered in partnership with the Derwent Valley Council, this program is reducing flood risk, improving river resilience, and restoring riparian ecosystems.

We are half way through this 3-year program and making great progress. On Sorell Creek, drilling and filling of willows has been completed from Collinsville downstream for 3 km, and from the Lyell Highway through to Molesworth Primary School. Extensive work has been carried out on the Feugal Hill property, targeting large willows along a tributary near Molesworth Primary School. Operations at the site required excavator removal of the willows, burning of piles, and complementary revegetation included a school planting activity with Molesworth Primary as part of National Tree Day.

On Glen Dhu Rivulet, all drilling and filling has now been completed. Revegetation has been carried out along 1.5 km of the rivulet from Molesworth Road upstream, with around 2,000 plants established.



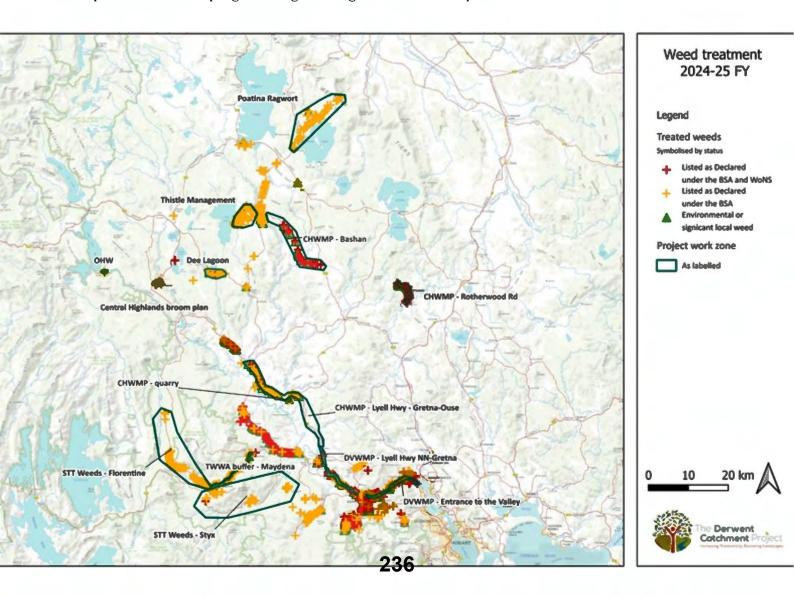
STRATEGIC WEED MANAGEMENT

Effective weed control relies on a strategic, landscape-scale approach to maximise impact and resource efficiency. The Derwent Catchment Project coordinates regional weed management by facilitating action across private land, councils, state agencies and industries. This collaboration avoids duplication and ensures priority areas are targeted. Activities are guided by the Derwent Valley, Central Highlands, and Brighton Weed Management Plans, which align with key eradication zones across these municipalities.

Regional Municipal Weed Management Plans

Each year we treat and monitor priority weeds across strategic eradication and management zones guided by the Central Highlands, Derwent Valley, and Brighton Weed Management Plans. This includes extensive roadside control and targeted species and site specific programs. The map below highlights the zones and control points where work has been carried out.

This season, 15,000+ weeds were tagged and treated across the catchment, significantly reducing weed pressure and helping to safeguard high-value landscapes.





Central Highlands Weed Management Plan

Dee Lagoon - supported by TasNetworks, Hydro, Sustainable Timbers Tasmania, and Central Highlands Council

Initial weed control sites have been monitored and controlled where required to prevent regrowth. Recently burnt areas affected by the 2024 fire near Dee Lagoon were assessed and treated for emerging weeds such as thistles.

Control efforts over the last year targeted Californian thistle, Scotch thistle, gorse, canary broom, English broom, cotoneaster, and sweet briar. A key focus was also the removal of large holly and broom plants interspersed within native vegetation, using a cut-and-paste method with herbicide to minimise off-target damage and support native regeneration.

At the southern area of the Dee Lagoon treatment site, work has shifted from broad-scale spraying to targeted cut-and-paste and knapsack treatments, reducing herbicide use while maintaining coverage. Infestations are now confined to smaller patches, allowing crews to progressively work into core areas and keep weed pressure low.



Community Weed Workshops - supported by TasNetworks and Hydro Tasmania

A Great Lakes Community Day was held in January as part of DCP's community engagement and capacity-building program. The event focused on building local skills in weed management, including hands-on training in controlling English broom, gorse, lupins, and ragwort. Participants were introduced to best-practice techniques and given the opportunity to apply them in the field.

Additional support was provided through funding from the Cattle Hill Wind Farm grant, which enabled the purchase of a community chemical storage unit and funded chemical handling training for local participants. This ensures the community is now equipped and accredited to carry out its own safe and effective weed management into the future.

Orange Hawkweed - supported by Central Highlands Council, Hydro Tasmania, Sustainable Timbers Tasmania, and the Department of State Growth.

The orange hawkweed program has been running for over a decade - the main sites include Butler's Gorge, Shannon, Miena, and a smaller patch at The Steppes. This year a new control method was trialled, shifting from individual spot-spraying to a 1 m² square-metre spray treatment using a stronger formulation. This technique, adapted from NSW Parks programs, is used only on dry sites and is showing strong early results, with noticeable reductions in infestation density.

Surveillance efforts have included the use of scent-detection dogs at Bronte Park, where mapping revealed about 50% success under the old approach. A new subdivision at Bronte Park disturbed contaminated soil and spread hawkweed, which is now under active management with support from engaged landholders. Further risk management includes collaboration with TasNetworks to treat areas under powerlines, where machinery is suspected of contributing to spread.



Tarraleah Broom - supported by Parks and Wildlife Services, TasNetworks, Hydro, Sustainable Timbers Tas and Central Highlands Council.



Poatina Ragwort - supported by TasNetworks and Hydro Tasmania

The Derwent Catchment Project completed targeted ragwort control at Poatina in February with 8 days of work from Arthurs Lake to the Northern Midlands boundary. This work is ongoing from the major Poatina fire in 2013. A survey was also conducted to map ragwort distribution and refine our monitoring method.

The Tarraleah broom eradication program has made significant progress, with crews having worked through the main infestations and now shifting to the mop-up phase.

80% of the original infestation has been controlled.

Current efforts focus on treating scattered regrowth and isolated plants, supported by follow-up management burns to deplete the seedbank and prevent reinfestation.

Work has extended around the township and along key access corridors, steadily reducing broom density and improving access for future management.

With two years of active work remaining, the program is on track to transition to periodic monitoring and targeted maintenance to keep the area free from woody weeds.



Derwent Valley Weed Management Plan

Horticulture zone - supported by the Department of State Growth, TasRail, the horticulture industry and Derwent valley Council

From Westerway to New Norfolk, 33 km of roadside blackberry has been treated in line with the Derwent Valley Biosecurity Plan's goal of removing alternative fruit-fly hosts from horticultural areas.

Intensive control, follow-up treatments, and slashing have also created a cleaner, connected corridor along the Lyell Highway and Boyer Road. The results are highly visible, with a marked decline in blackberry density, improved landholder access, and a significantly enhanced entrance to the Derwent Valley.



Lyell Highway - Entrance to the Valley - supported by the Department of State Growth, private landholders and the Derwent Valley Council

Woody weed control has been carried out along the Lyell Highway from north of Ouse to New Norfolk, supporting neighbouring landholders and delivering corridor-wide coverage. Infestations of fennel, broom, and blackberry between Ouse and Gretna were systematically treated, with blackberry eradication extended across all management zones removing alternative fruit-fly hosts.

Significant plants near Granton were removed manually to mitigate spray-drift impacts on local wineries, and targeted spot-spraying between Granton and New Norfolk addressed smaller outbreaks, ensuring comprehensive coverage along the entire corridor.





Protecting the World Heritage Area - supported by TasRail, Sustainable Timbers Tasmania, SFM/ New Forests, Derwent Valley Councils and alignment with Department of State Growth

Targeted control of foxglove and Spanish heath has been carried out along the Maydena section of the Gordon River Road, aligning with the Derwent Valley Council Roadside Management Plan and the Sustainable Timbers Tasmania/Lenah Valley – New Forest (SFM) Strategic Weed Plan. These coordinated efforts ensure consistent management across priority transport and conservation corridors.

Stage 1 of the TasRail Derwent Valley Treatment Plan has been completed, focusing on the TWWHA buffer. Foxglove and Spanish heath have also been treated along Plenty Road, Styx Road, Florentine, and associated routes, with particular attention to the 60 km Spanish heath buffer zone between Maydena and Strathgordon.

Follow-up treatments for Californian thistle are maintaining effective suppression of this invasive species.



Invasive Grasses - supported by TasNetworks, private landholders, Brighton and Derwent Valley Councils.

The Espartillo treatment program has delivered encouraging results, with the primary infestation now far more manageable following the removal of dense African boxthorn that had hindered access. DCP has developed Weed Management Plans for serrated tussock and Chilean Needle Grass in key Brighton locations, with serrated tussock control at Granton now in its final stage and ongoing management handed to landholders.

To support broader landscape outcomes, DCP has applied to the upcoming round of the Weed Action Fund's Invasive Grasses program to coordinate control efforts across northern and southern Tasmania.





Invasive Grasses: Weed Management Plan: Boyer Mill - supported TasNetworks, and Boyer Paper Mill LTD.

A targeted weed management plan has been developed following a comprehensive review of a significant African feathergrass and Pampas grass infestation at the Boyer Mill. Initial treatments conducted jointly by the landholder and the Derwent Catchment Project team focused on controlling plants beneath the transmission lines.

The plan involves the creation of dedicated access tracks to enhance treatment efficiency and the evaluation of drone-based herbicide application. This site will be formally integrated into the broader African feathergrass Weed Management Plan for the Derwent Valley, ensuring coordinated control efforts across the catchment.

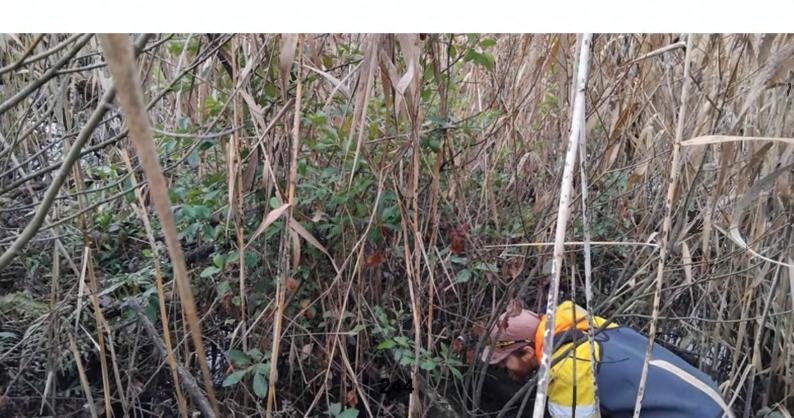




Karamu - supported by Derwent Estuary program, Department of State Growth, Property Services, Derwent Valley Council, Parks and Wildlife Service.

We are tackling Tasmania's largest karamu infestation through a long-term, management planguided program supported by annual stakeholder contributions and focused on manual removal with targeted chemical treatment. Control is challenging as karamu thrives in dense riparian zones, spreads via birds and floods, and is often entwined with blackberry, requiring crews to use ropes to access steep terrain. Recent floods have disturbed riverbanks, triggered new seedling growth, as confirmed by the 2024–2025 comprehensive resurvey of the river corridor. Landowners have contributed complementary control efforts, improving access and supporting more effective treatment.

Although the infestation still spans the same river length, its density is now much lower with all primary control completed. Continued monitoring and follow-up control will be essential to suppress regrowth from the seed bank and secure these gains.



Brighton Council Weed Management Plan

The Derwent Catchment Project has launched a targeted trial to control African boxthorn along the Brighton foreshore, carefully balancing cultural sensitivity with operational efficiency. In areas of high Indigenous heritage value, all work is guided by Traditional heritage protocols: DCP staff conduct pretreatment site walks, limit ground disturbance, and employ spot-herbicide and hand-removal only to ensure site preservation.

The project has deployed large-scale mechanical removal at non-Indigenous sites where cultural constraints do not apply, using excavators and mulchers to clear dense thickets rapidly and prepare the ground for follow-up treatments. This dual approach ensures that culturally significant areas are protected while allowing for efficient, landscape-scale weed management elsewhere, with early results informing a catchment-wide control protocol.

Cultural heritage sites were protected while 20 truck loads of boxthorn were removed from the Brighton foreshore with support from Brighton Council, TasWater, and local landholders. As part of National Tree Day 10 volunteers assisted DCP plant 150 grasses, shrubs and trees to restore the Old Beach foreshore area where boxthorn had been removed.



COMMUNITY ENGAGEMENT

Greening Brighton

Brighton Council aims to increase tree and plant cover to strengthen climate resilience. To support this, DCP hosted a stall at the Bridgewater Bridge Opening, promoting native species for nature strips and small gardens. Karen from the nursery, provided a life-size display with examples of plants available at the nursery. Visitors were encouraged to design their own small garden to receive a couple of plants for their garden. The plant giveaway was supported by the Department of State Growth.

Grassland Management

As part of a Grasslands Management Plan for a threatened grassland community at the Brighton Racecourse DCP facilitated an ecological and fuel reduction burn, which was successfully undertaken in June. Working with Brighton Council and Tasracing, a follow-up baseline plant survey is planned for Spring.

Kutalayna Community Cares for Country

Together, Brighton Council, Connected Beginnings Lutruwita (Kutalayna Collective) and DCP have launched the Kutalayna Community Cares for Country project. In June, East Derwent Primary School's Cultural Group visited Green Point Reserve at the Kutalayna/Jordan River and Timtumili Minanya/River Derwent junction. The excursion highlighted the site's cultural and ecological significance and introduced students to caring for Country. This was the first of four events linking the Kutalayna community with Country through land restoration activities, cultural knowledge exchange and creative practice. The program focuses on climate adaptation and youth involvement in environmental challenges and is supported by State Government funding.



Tas TAFE partnership

Through our ongoing partnership with TAS TAFE, the Derwent Catchment Project has been actively engaging Certificate III Ecological Restoration students. This collaboration aims to enhance their practical skills in land restoration.

This year we have conducted four river restoration working bees, where students applied their classroom study in real scenarios, bridging theory to application skills. Students also visited our native plant nursery in Hamilton, learning about nursery operations and native revegetation techniques, including seed collection and planting.

Pleased with the students' enthusiasm and skill development, we look forward to continuing our partnership with TAS TAFE and creating future programs to support their professional growth.



NURSERY EXPANSION

The nursery has undergone major upgrades over the past year, doubling its footprint through the removal of tow large pine trees and site excavations. The expanded area has been gravelled, fitted with new benches, irrigation, electricity to the hot house and shed, shed lining, and a new perimeter fence—creating a strong platform for the next stage of development.

Production was strong this year, with around 31,000 plants grown and capacity is aiming to rise to 80,000 in the coming season. Propagation by cuttings will expand the range of species available. Promotion through Bushfest, local shows, the New Norfolk Market, and advertising in the Highland Digest has boosted sales, engagement, and built a growing customer base.

Thanks to the Central Highlands, Brighton and Derwent Valley Councils for supporting our native plant nursery expansion project.





Thank you for your support Councils!









And thanks to all our funders & supporters



Biosecurity Tasmania



































APPENDIX 1 AUDITED FINANCIALS



The Derwent Catchment Project Inc

ABN 53 230 571 121

Special Purpose Financial Report

For the year ended 30 June 2025

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Statement of Profit or Loss and Other Comprehensive Income

	2025	2024
	\$	\$
Income		
Donations	48	3,385
Fee for Service	492,022	578,434
Grants - Local Government	462,800	205,000
Grants - Other	39,168	140,721
Grants - State Government	448,411	580,812
Memberships	1,209	2,241
Nursery Sales	25,827	34,983
Other Income	2,644	959
Other Reimbursements	3,472	-
Other Sales	-	12,545
Total Income	1,475,601	1,559,079
Expenses		
Accounting and Audit Fees	23,795	17,914
Catering	2,101	3,324
Cleaning	150	3,210
Conference/Seminar/Training	3,038	4,295
Contract Labour	644,082	757,817
Depreciation	30,277	21,177
Electricity	599	908
Fuel	21,515	22,678
Insurance	41,033	31,909
Interest	3,938	4,217
Internet	1,257	-
Leave Provisions	(37,241)	26,423
Motor Vehicle Registrations	-	4,247
Nursery Supplies and Chemicals	7,511	17,124
Office Supplies	7,526	1,526
PPE/Safety Gear	5,177	5,789
Project Materials	98,881	114,638
Registrations	6,941	3,102
Rent	12,832	14,752
Repairs and Maintenance	1,825	2,241
Salaries and Wages	482,442	496,581
Stipend	6,500	6,473

Statement of Profit or Loss and Other Comprehensive Income

	2025 \$	2024 \$
Subscriptions	4,513	6,068
Sundry Expenses	802	2,039
Superannuation	52,264	54,526
Telephone	1,679	1,129
Travel	2,680	4,330
Vehicle Repairs and Maintenance	20,406	16,592
Website Cost	242	-
Total Expenses	1,446,765	1,645,031
Profit/(Loss)	28,836	(85,952)
Total Comprehensive Income	28,836	(85,952)

Statement of Financial Position

As at 30 June 2025

A3 at 30 Julie 2023		2025	2024
	Note	\$	\$
Assets			
Current Assets			
Cash and Cash Equivalents	2	657,886	301,386
Trade and Other Receivables	3	186,569	283,195
Inventories		66,270	56,565
Prepayments	_	15,044	43,860
Total Current Assets		925,769	685,006
Non Current Assets			
Property, Plant and Equipment	4	138,161	168,437
Total Non Current Assets		138,161	168,437
Total Assets		1,063,930	853,444
Liabilities			
Current Liabilities			
Income Received in Advance		529,425	214,091
Loans	5	16,854	15,532
Provisions	6	26,505	64,359
Trade Payables	7	163,887	244,798
Total Current Liabilities	_	736,671	538,780
Non Current Liabilities			
Loans	5	21,486	38,340
Provisions	6	13,141	12,528
Total Non Current Liabilities	_	34,627	50,868
Total Liabilities		771,298	589,648
Net Assets	_	292,632	263,796
Equity			
Opening Retained Earnings		263,796	349,748
Current Year Profit/(Loss)		28,836	(85,952)
Total Equity	_	292,632	263,796

Statement of Changes in Equity

As at 30 June 2025

	Retained Earnings \$	Total Equity
Balance at 1 July 2023	349,748	349,748
Profit/(Loss) For the Year	(85,952)	(85,952)
Balance at 30 June 2024	263,796	263,796
Balance at 1 July 2024	263,796	263,796
Profit/(Loss) For the Year	28,836	28,836
Balance at 30 June 2025	292,632	292,632

Statement of Cash Flows

	2025 \$	2024 \$
Cash Flows from Operating Activities		
Cash Receipts from Customers	680,083	799,857
Cash Receipts from Government	1,392,284	1,029,006
Interest Received	2,644	-
Cash Paid to Suppliers and Employees	(1,702,687)	(1,778,206)
Net cash provided by (used in) operating activities	372,324	50,657
Cash Flows from Investing Activities		
Acquisition of Property, Plant and Equipment	<u> </u>	(174,282)
Net cash provided by (used in) investing activities		(174,282)
Cash Flows from Financing Activities		
Borrowings	(15,824)	53,872
Net cash provided by financing activities	(15,824)	53,872
Net Increase/(Decrease) in Cash and Cash Equivalents	356,500	(69,753)
Cash and Cash Equivalents at the Beginning of the Year	301,386	371,139
Cash and Cash Equivalents at the End of the Year	657,886	301,386

Notes to the Financial Statements

For the year ended 30 June 2025

General Information

The financial report covers The Derwent Catchment Project Inc as an individual entity. The Derwent Catchment Project Inc is incorporated under the *Associations Incorporation Act 1964* and domiciled in Tasmania.

Basis of Preparation

The financial report is a special purpose financial report prepared in order to satisfy the financial reporting requirements of the Associations Incorporation Act 1964, the requirements of the Association's Constitution and the requirements of the Australian Charities and Not-for-profits Commission Act 2012 (Cth). The Board of Governance has determined that the Association is not a reporting entity because there are no users dependent on a general purpose financial report.

The Association is a not-for-profit entity for financial reporting purposes under the Accounting Standards.

The financial statements, other than the statement of cash flows, has been prepared on an accruals basis and are based on historical costs and do not take into account changing money values or, except where stated, current valuations of non-current assets. Cost is based on the fair value of the consideration given in exchange for assets.

The following significant accounting policies have been adopted in the preparation of these statements and are consistent with prior years unless otherwise stated.

AASB 101 Presentation of Financial Statements
AASB 107 Statement of Cash Flows
AASB 108 Accounting Policies, Changes in Accounting Estimates and Errors
AASB 124, Related Party Disclosures
AASB 1048 Interpretation of Standards
AASB 1054 Australian Additional Disclosures.

Note 1 Accounting Policies

a) Cash and Cash Equivalents

Cash and cash equivalents include cash on hand and deposits held at call with banks.

b) Property, Plant and Equipment

Non-current assets are bought to account at cost less any accumulated depreciation. The carrying amount of fixed assets is reviewed annually to ensure it is not in excess of the recoverable amount of these assets. The recoverable amount is assessed on the basis of expected net cash flows which will be received from the assets employment and subsequent disposal.

Notes to the Financial Statements

For the year ended 30 June 2025

Depreciation

The depreciable amount of all fixed assets are depreciated on a straight line or a diminishing value basis over the useful lives of the assets to the Association commencing from the time the asset is held ready for use.

The depreciation rates used for each class of depreciable assets are:

Class of Fixed Asset	Depreciation Rate	
Motor Vehicles	15%	
Plant and Equipment	25%	

c) Leases

At inception of a contract, the Association assesses if the contract contains or is a lease. If there is a lease present, a right-of-use asset and a corresponding lease liability is recognised by the Group where the Group is a lessee. However, all contracts that are classified as short-term leases (lease with remaining lease term of 12 months or less) and leases of low-value assets are recognised as an operating expense on a straight-line basis over the term of the lease.

Initially, the lease liability is measured at the present value of the lease payments still to be paid at the commencement date. The lease payments are discounted at the interest rate implicit in the lease. If this rate cannot be readily determined, the Group uses the incremental borrowing rate.

Lease payments included in the measurement of the lease liability are as follows:

- fixed lease payments less any lease incentives;
- variable lease payments that depend on an index or rate, initially measured using the index or rate at the commencement date;
- the amount expected to be payable by the lessee under residual value guarantees;
- the exercise price of purchase options, if the lessee is reasonably certain to exercise the options;
- lease payments under extension options if lessee is reasonably certain to exercise the options; and
- payments of penalties for terminating the lease, if the lease term reflects the exercise of an option to terminate the lease.

The right-of-use assets comprise the initial measurement of the corresponding lease liability as mentioned above, any lease payments made at or before the commencement date as well as any initial direct costs. The subsequent measurement of the right-of-use assets is at cost less accumulated depreciation and impairment losses.

Right-of-use assets are depreciated over the lease term or useful life of the underlying asset whichever is the shortest. Where a lease transfers ownership of the underlying asset or the cost of the right-of-use asset reflects that the Group anticipates to exercise a purchase option, the specific asset is depreciated over the useful life of the underlying asset.

d) Employee Benefits

Short-Term Employee Benefits

Liabilities for wages and salaries, annual leave and long service leave expected to be settled wholly within 12 months of the reporting date are measured at the amounts expected to be paid when the liabilities are settled.

Notes to the Financial Statements

For the year ended 30 June 2025

Other Long-Term Employee Benefits

Provision is made for employees' long service leave and annual leave entitlements not expected to be settled wholly within 12 months after the end of the annual reporting period in which the employees render the related service. Other long-term employee benefits are measured at the present value of the expected future payments to be made to employees. Expected future payments incorporate anticipated future wage and salary levels, durations of service and employee departures, and are discounted at rates determined by reference to market yields at the end of the reporting period on high quality corporate bonds that have maturity dates that approximate the terms of the obligations. Upon the remeasurement of obligations for other long-term employee benefits, the net change in the obligation is recognised in profit or loss as part of employee provisions expense.

e) Revenue and Other Income

Revenue comprises income from the sale of services, grants, client contributions and donations. Revenue is recognised when the amount of revenue can be measured reliably, collection is possible, the costs incurred or to be incurred can be measured reliably.

Revenue from grants is recognised as income in the same year as the corresponding expenses are incurred. Unexpended grant revenue is deferred at the end of each financial year Unexpended grants are recognised as a liability on the balance sheet called Income Received in Advance.

All revenue is stated net of the amount of goods and services tax (GST).

f) Trade and Other Receivables

The association considers accounts receivable to be fully collectible, accordingly no allowance for doubtful accounts is required.

Trade receivables are recognised initially at the transaction price (ie cost). Most sales are made on the basis of normal credit terms and do not bear interest. Receivables are not discounted to present value. Receivables expected to be collected within 12 months of the end of the reporting period are classified as current assets. All other receivables are classified as non-current assets.

g) Trade and Other Payables

Trade and other payables represent the liabilities for goods and services received by the Association that remain unpaid at the end of the reporting period. The balance is recognised as a current liability with the amounts normally paid within 30 days of recognition of the liability.

h) Goods and Services Tax (GST)

Revenues, expenses and assets are recognised net of the amount of GST, except where the amount of GST incurred is not recoverable from the Australian Taxation Office (ATO).

Receivables and payables are stated inclusive of the amount of GST receivable or payable. The net amount of GST recoverable from, or payable to, the ATO is included with receivables or payables in the balance sheet.

i) Income Tax

The Association is exempt from income tax under Division 50 of the Income Tax Assessment Act 1997.

Notes to the Financial Statements

For the year ended 30 June 2025

j) New & Amended Accounting Policies

The Association has adopted all standards which became effective for the first time for the period ending 30 June 2025, and the adoption of these standards has not caused any material adjustments to the reported financial position, performance or cash flow of the Association.

	2025	2024
Note 2 Cash and Cash Equivalents	\$	\$
Donations Account	48	-
General Cheque Account	558,323	198,440
General Savings Account	19,285	99,062
Petty Cash Account	230	3,884
Term Deposit	80,000	-
Total Cash and Cash Equivalents	657,886	301,386
	2025	2024
Note 3 Trade and Other Receivables	\$	\$
Accrued Revenue	2,421	-
Borrowing Cost	699	1,022
Deposits Paid	59	59
Trade Debtors	183,390	282,114
Total Trade and Other Receivables	186,569	283,195
	2025	2024
Note 4 Property, Plant and Equipment	\$	\$
Computer Equipment		
Computer Equipment at Cost	3,921	3,921
Computer Equipment Accumulated Depreciation	(3,284)	(2,425)
Total Computer Equipment	637	1,496
Motor Vehicles		
Vehicles at Cost	174,411	174,411
Vehicles Accumulated Depreciation	(54,654)	(28,701)
Total Motor Vehicles	119,757	145,710

Notes to the Financial Statements

	2025	2024
Note 4 Property, Plant and Equipment	\$	\$
Plant and Equipment		
Plant & Equipment	33,711	33,711
Plant & Equipment Accumulated Depreciation	(16,562)	(14,931)
Total Plant and Equipment	17,149	18,780
Website		
Website	5,500	5,500
Website Accumulated Amortisation	(4,882)	(3,049)
Total Website	618	2,451
Total Property, Plant and Equipment	138,161	168,437
	2025	2024
Note 5 Loans	\$	\$
Current		
Loan - Motor Vehicle	19,470	19,470
Less: Unexpired Interest and Admin Fee	(2,616)	(3,938)
Total Current	16,854	15,532
Non-Current		
Loan - Motor Vehicle	22,715	42,185
Less: Unexpired Interest and Admin Fee	(1,229)	(3,845)
Total Non-Current	21,486	38,340
Total Motor Vehicle Loan	38,340	53,872

Notes to the Financial Statements

For the year ended 30 June 2025

	2025	2024
Note 6 Provisions	\$	\$
Current		
Provision for Annual Leave	26,505	64,359
Total Current	26,505	64,359
Non-Current		
Provision for Long Service Leave	13,141	12,528
Total Non-Current	13,141	12,528
Total Provisions	39,646	76,887
	2025	2024
Note 7 Trade Payables	\$	\$
Accrued Expenses	13,799	16,711
GST Payable	54,859	33,901
PAYG Payable	5,089	32,242
Superannuation Payable	8,088	14,791
Trade Creditors	82,052	147,153
Total Trade Payables	163,887	244,798

Note 8 Cash Flow Information

k) Reconciliation of result for the year to cashflows from operating activities

	2025	2024
	\$	\$
Net surplus/(deficit) for the year	28,836	(85,952)
Cash flows excluded from surplus attributable to operating activities:		
- Depreciation	30,277	7,766
- Loss on Disposal of Fixed Assets	-	13,725
Changes in assets and liabilities		
- (increase)/decrease in trade and other receivables	96,625	64,807
- (Increase)/decrease in prepayments	28,816	(36,558)
- (Increase)/decrease in inventories	(9,705)	(220)
- Increase/(decrease) in trade and other payables	(80,618)	(63,425)

The Derwent Catchment Project Inc Notes to the Financial Statements

For the year ended 30 June 2025

	2025	2024
	\$	\$
- Increase/(decrease) in provisions	(37,241)	26,423
- Increase/(decrease) in deferred income	315,334	124,091
Cash flows from Operations	356,500	50,657
	2025	2024
Note 9 Auditors Remuneration	\$	\$
Audit and assistance in the preparation of financial statements	5,800	965
	5,800	965

Note 10 Related Party Transactions

During the financial year, there were 3 related parties with whom the Association had transactions. Dr Josie Kelman is the CEO and Public Officer of the Association, and the Managing Director and a beneficial owner of Enviro-Dynamics Pty Ltd. Jim Allwright is a committee member of the Association and Deputy Mayor of Central Highlands Council (CHC). All transactions are stated excluding GST and were on commercial arms-length terms.

	2025	2024	
	\$	\$	
Income received from Enviro-Dynamics	1,200	6,620	
Expenses paid to Enviro-Dynamics	(612,240)	(600,001)	
Income received from CHC	614,436	114,936	
Income received from Compass Agribusiness	-	2,080	

Board Declaration

For the year ended 30 June 2025

The Board have determined that the Association is not a reporting entity and that this special purpose financial report should be prepared in accordance with the accounting policies prescribed in Note 1 to the financial statements.

The Board declare that:

- 1. The financial statements and notes are in accordance with the *Australian Charities and Not-for-profits Commission Act 2012 (Cth)* and:
 - a. Comply with Australian Accounting Standards to the extent described in Note 1 of the financial statements; and
 - b. Give a true and fair view of the financial position at 30 June 2025 and of the performance for the year ended on that date of the Association in accordance with the accounting policy described in Note 1 of the financial statements.
- 2. In the Board's opinion, there are reasonable grounds to believe that the Association will be able to pay its debts as and when they become due and payable.

This declaration is signed in accordance with subsection 60.15(2) of the *Australian Charities and Not-for-profits Commission Regulation 2013*.

Board Member		
Board Member		
Date:		

Auditor's Independence Declaration

For the year ended 30 June 2025

To the Board of The Derwent Catchment Project Inc.

In accordance with Subdivision 60-C of the *Australian Charities and Not-for-profits Commission Act 2012*, I am pleased to provide the following declaration of independence to the Board of The Derwent Catchment Project Inc. As the lead audit partner for the audit of the financial report of The Derwent Catchment Project Inc for the year ended 30 June 2025, I declare that, to the best of my knowledge and belief, during the year ended 30 June 2025 there have been no contraventions of:

- i. the auditor independence requirements as set out in *Australian Charities and Not for Profits Commission Act 2012* in relation to the audit; and
- ii. any applicable code of professional conduct in relation to the audit.

Ruddicks	
.02 Tamar Street, Launceston TAS 725	50
Daniel Newton	
Date:	

Independent Auditor's Report

For the year ended 30 June 2025

Report on the Financial Report

Opinion

I have audited the financial report of The Derwent Catchment Project Inc (the Association), which comprises the statement of financial position as at 30 June 2025, the statement of profit or loss and other comprehensive income for the year then ended, statement of cash flows, statement of changes in equity, and notes to the financial statements, including a summary of significant accounting policies, and the Board's declaration on the annual statements giving a true and fair view of the financial position and performance of the Association.

In my opinion, the accompanying financial report of The Derwent Catchment Project Inc is in accordance with Division 60 of the *Australian Charities and Not-for-profits Commission Act 2012*, including:

- a) giving a true and fair view of the financial position as at 30 June 2025, and of its financial performance for the year then ended; and
- b) complying with Australian Accounting Standards to the extent described in Note 1, and Division 60 the *Australian Charities and Not-for-profits Commission Regulations 2012*.

Basis for Opinion

I conducted my audit in accordance with Australian Auditing Standards. My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Report* section of my report. I am independent of the association in accordance with the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110: *Code of Ethics for Professional Accountants* (the Code) that are relevant to my audit of the financial report in Australia. I have also fulfilled my other ethical responsibilities in accordance with the Code.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Emphasis of Matter – Basis of Accounting

I draw attention to Note 1 of the financial report, which describes the basis of accounting. The financial report has been prepared to assist the Association to meet the requirements of the Associations Incorporation Act 1964 and the Australian Charities and Not-for-profits Commission Act 2012. As a result, the financial report may not be suitable for another purpose. My opinion is not modified in respect of this matter.

Responsibility of the Board for the Financial Report

The Board are responsible for the preparation of the financial report that gives a true and fair view and have determined that the basis of preparation described in Note 1 to the financial report is appropriate to meet the requirements of the *Australian Charities and Not-for-profits Commission Act 2012*. The Board's responsibility also includes such internal control as the Board determines is necessary to enable the preparation of a financial report that gives a true and fair view and is free from material misstatement, whether due to fraud or error.

In preparing the financial report, the Board are responsible for assessing the Association's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless the Board either intend to liquidate the Association or to cease operations, or have no realistic alternative but to do so. The Board are responsible for overseeing the registered entity's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Report

My objectives are to obtain reasonable assurance about whether the financial report as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but it is not a guarantee that an audit conducted

Independent Auditor's Report

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in accordance with the Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of this financial report.

As part of an audit in accordance with the Australian Auditing Standards, I exercise professional judgement and maintain professional scepticism throughout the audit. I also:

- Identify and assess the risks of material misstatement of the financial report, whether due to fraud or error, design and perform audit procedures responsive to these risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud my involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Association's internal control.
- Evaluate the appropriateness of the accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board.
- Conclude on the appropriateness of the Boards' use of the going concern basis of accounting and, based on audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Association's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial report or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the Association to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial report, including the disclosures, and whether the financial report represents the underlying transactions and events in a matter that achieves fair presentation.

I communicate with the Board regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.