



ASTROTOURISM
WESTERN AUSTRALIA

2019-2023

STRATEGIC PLAN


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Hi there, welcome to Astrotourism Western Australia

TABLE OF CONTENTS

| | |
|----|------------------------|
| 3 | TABLE OF CONTENTS |
| 5 | FOREWORD |
| 6 | WHY WESTERN AUSTRALIA? |
| 8 | ECONOMIC BENEFIT |
| 10 | VISION |
| 12 | OBJECTIVE |
| 13 | PARTNERS |
| 14 | CORE VALUES |
| 15 | OUTCOMES |
| 16 | STRATEGIC FOCUS |
| 19 | REFERENCES/DEFINITIONS |



WA's artificial light pollution is concentrated in one very small area of the State, leaving a vast dark night sky for visitors from all over the globe to enjoy world-class stargazing and astronomical activities.

All we have to do is keep it dark!

Foreword

FROM THE FOUNDER/CEO, CAROL REDFORD

Western Australia is perfectly placed to become the stargazing capital of the world and grow an Astrotourism economy across the State.

WA has many comparative advantages that make us an ideal destination to access a pristine dark night sky where the Milky Way Galaxy can be seen in its true and original form.

Increasing artificial light pollution across Earth has quickly reduced humanity's ability to see the stars. The ever increasing artificial light that spills up into the night sky, means we see less stars. More than 80% of the world's population live under a light-polluted sky and as a result, the Milky Way is hidden from more than one-third of humanity¹.

Aboriginal people experienced tens of thousands of years without any artificial light pollution to dull the view of the stars. Their connection to the dark night sky provides information on seasonality, food sources,

navigation and traditional lore. Here is a population of people who truly understand their environment and how it sustains life.

Western Australians are still fortunate to have easy access to a pristine dark night sky because Perth is the most isolated capital city in the world. Almost 80% of WA's population live in just 0.25% of its land mass².

People now travel to see a dark night sky just as they travel to see other icons such as the Great Barrier Reef, the Amazon Rainforest or Antarctica. A dark night sky has become a rarity and can't be seen everywhere.

In April 2023, WA will be the best place in the world to see a rare Total Solar Eclipse that will be visible from the Ningaloo coastline. This event will attract tens of thousands of extra visitors to WA and will bring along with it, world-wide media attention. An Astrotourism sector, established prior to this event, will encourage visitors to

stay longer to experience stargazing at its best. There are just four years to grow our capabilities to ensure we capitalise on the rare event.

Regional towns will capitalise on the global media spotlight generated by the 2023 Ningaloo Eclipse and Western Australia will consolidate itself as the world's premier destination for stargazing and astronomy.

I am proud to be introducing Astrotourism to Western Australia. The release of this strategic plan outlines how communities in Western Australia can work together to protect and promote our dark night sky. This plan builds a pathway to increase overnight stays in regional WA, grow an economy around Astrotourism and take action to preserve the awe-inspiring sight of WA's world-class dark night sky for decades to come.

WHY WESTERN AUSTRALIA?



WA has many comparative advantages that make it one of the best places in the world for stargazing and astronomy related activities.

A Dark Night Sky

Perth is the most isolated capital city in the world. Almost 80% of WA's population live in just 0.25% of its land mass² leaving a low regional population spread out over hundreds of country towns with low levels of artificial light pollution.

WA's dark night sky stands out as a rare commodity in a world where artificial light pollution is increasing by 2% in brightness and 2% in area every year³. The New World Atlas of Artificial Sky Brightness has found that more than 80% of the world's population live under a light-polluted sky and the Milky Way is hidden from more than one-third of humanity¹.

WA has naturally low levels of artificial light pollution paired with easy-to-access places for stargazing and astronomy related activities. You don't have to travel far from Perth city lights to find a pristine dark night sky for the best stargazing on the planet.

Best of all, the dark night sky doesn't require any maintenance or development and can be seen simply and freely with the naked-eye. The view of the stars also changes through the seasons and, occasionally, delights us with astronomical surprises such as eclipses, comets and meteor showers.

The Right Place

WA is located in the Southern Hemisphere where the best parts of the Milky Way can be seen. Only in the Southern Hemisphere can you look into the heart of the Milky Way Galaxy, see the Magellanic Clouds, the Southern Cross, the Jewel Box star cluster and much more. Many astronomers and



stargazers in the Northern Hemisphere are envious of our location.

The Right Conditions

WA has the right conditions for optimal stargazing and astronomy. The many advantages we have include:

- Low artificial light pollution for a dark night sky;
- Low air pollution for a clean atmosphere to look through;
- Clear and dry weather for good access to the night sky. Perth is the sunniest State capital in Australia and has the highest daily average number of bright sunshine hours in Australia⁴;
- Wide open landscapes and space for a big dark night sky stretching from horizon to horizon;
- Low noise pollution for peaceful contemplation of the landscape and night sky; and
- Radio quietness for an ideal location to build the Square Kilometre Array (SKA) radio telescope mega science project.

Only in the Southern Hemisphere can you look into the heart of the Milky Way Galaxy, see the Magellanic Clouds, the Southern Cross, the Jewel Box star cluster and much more.



A Cutting-Edge Space Science Industry

Western Australia is a strategic location for space industry investment. We are home to world-class space science projects with international links. These include:

- The \$1.3B SKA radio telescope being built in the Mid West will look back 13 billion years to discover how stars and black holes formed;
- International Centre for Radio Astronomy Research (ICRAR) is a multi-disciplinary research centre for science, engineering and data intensive astronomy supporting the SKA;
- Pawsey Supercomputing Centre is one of two, Tier-1, High Performance Computing facilities in Australia, accelerating scientific research;
- European Space Agency has its strategic Deep Space Antenna, used for satellite tracking, located south of New Norcia;
- WA Space Centre near Mingenew is a base for NASA, Japan Aerospace Exploration

Agency (JAXA), Swedish Space Corp, China Satellite Launch and Tracking Control General, Geoscience Australia, National Centre for Space Studies (France) and Australia's Capricorn Space;

- The Desert Fireball Network, based at Curtin University, monitors 3 million km² of the Australian night sky and uses intelligent imaging systems with trajectory triangulation to recover fallen meteorites;
- Learmonth Solar Observatory is utilised by the Australian Bureau of Meteorology and the United States Air Force;
- Australian International Gravitational Observatory in Gingin was fundamental in the ground-breaking first ever measurement of gravitational waves thus substantiating Einstein's theories; and
- World renowned astrophotographers and scientific organisations have observatories and remote telescope facilities in WA.

WA has a significant international and national presence in the space industry. Of 98 Australian companies operating in space and space related services, 74 have a presence in WA⁵.

Moreover, with the establishment of the new Australian Space Agency, career pathways in astronomy are available like never before

Quite simply, if you want to work in astronomy, study it, research it, build a business in it or simply experience it, Western Australia is the place to be.

ECONOMIC BENEFIT



“Crucially, from an economic standpoint, the single most important thing about dark-sky tourism is that it necessitates one or more overnight stays⁶.”

Being a night time activity, Astrotourism increases overnight stays. Estimating the Potential Economic Value of the Night Skies Above the Colorado is an economic evaluation of Astrotourism and says,

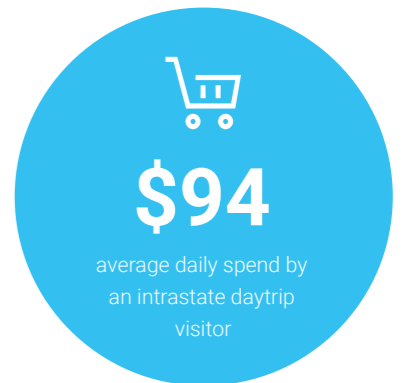
“Crucially, from an economic standpoint, the single most important thing about dark-sky tourism is that it necessitates one or more overnight stays⁶.”

Overnight stays lead to increased visitor spending. According to Tourism WA research, the average spend by an intrastate daytrip visitor in WA is \$94. The average daily spend by an intrastate overnight visitor in WA increases to \$120, with a total average spend of \$452⁷.

There are also opportunities for new Astrotourism related businesses and Aboriginal Astrotourism activities in regional WA to increase visitor spending. New businesses like these will drive the tourism economy and increase the average spend by visitors.

Furthermore, Astrotourism is an all-year round activity that will increase visitor numbers at traditionally off-peak tourism times. Although peak seasons, such as wildflowers, will always see a spike in visitor numbers for regional WA, Astrotourism can generate a more regular flow of visitors throughout the year. As such, Astrotourism will provide a longer and more sustained period of tourism activity which consequentially will generate a more consistent cash flow for regional businesses and service providers

Another economic benefit yet to be explored includes local energy savings associated with the use, or rather non-use, of dark-sky friendly lighting infrastructure for astronomy related activities.



VISION

**Western
Australians
value and
protect their
dark night
sky as an
international
icon for
world-class
stargazing and
astronomy
related
activities.**



OBJECTIVE

Working alongside valued partners, our objective is to establish a vibrant and sustainable Astrotourism sector across regional WA that will 1) increase tourism visitation, 2) diversify our regional economy and 3) leverage natural astronomical assets and investment already made in space and tourism infrastructure

This will be realised through an innovative collaborative networking model that will grow business and community connections as well as build commitment to the vision. The Astrotourism WA vision will culminate at the rare 2023 Ningaloo Total Solar Eclipse when WA will have an opportunity to claim its title as the stargazing capital of the world.



A vibrant and sustainable Astrotourism sector across regional WA...will be realised through an innovative collaborative networking model that will grow business and community connections as well as build commitment to the vision.

PARTNERS

The strategic focus of this plan will guide Astrotourism WA. Moreover, it will inform its key collaborative partners on the journey to make WA an international icon for world-class stargazing and astronomy related activities.

Current Local Government partners participating in the project include the City of Greater Geraldton and the Shires of Carnamah, Dandaragan, Mingenew, Moora, Morawa, Perenjori, Three Springs and Wongan-Ballidu.

This plan will also inform industry partners including:

- Astronomy WA
- International Dark-Sky Association

- Tourism WA
- Regional Tourism Organisations
- Forum Advocating Cultural & Eco-tourism Inc (FACET)
- Western Australian Indigenous Tourism Operators Council (WAITOC)
- Geoparks Western Australia Inc
- Regional Development Commissions; and
- Regional Development Australia (RDA)

Together we will achieve the objective to grow the tourism industry.



CORE VALUES

The core values central to Astrotourism WA's professionalism and engagement are to:

- Journey to a vision through collaboration
- Discover through fun and enjoyable engagement
- Maintain a sense of awe about the natural world at night



OUTCOMES

The anticipated SMART⁸ outcomes of developing an Astrotourism sector are:

01

Increased visitor numbers, overnight stays and expenditure in regional WA.

02

Increased jobs in WA's regional, labour-intensive Tourism Industry and industry sectors with associated services.

03

New SME⁹ business growth in both Aboriginal and non-Aboriginal sectors.

04

Tourism Industry diversification and growth.

05

Increased MICE¹⁰ activity in regional WA, specifically astronomy and stargazing related events.



Astrotourism activities and the development of the sector will also:

1. **Grow community capacity** through learning about astronomical science;
2. **Protect WA's dark night sky**;
3. **Create cultural diversity** through understanding of Aboriginal Astronomy;
4. **Rejuvenate existing tourism product**;
5. **Connect local students to Science, Technology, Engineering and Mathematics (STEM)** study, work experience and career pathways; and
6. **Promote stargazing as a way to keep mentally healthy** through a community partnership with WA's Act-Belong-Commit campaign.

STRATEGIC FOCUS

This plan has three areas where efforts will be focused across WA. Various activities within these focus areas aim to deliver the anticipated outcomes.

01 Engage community to raise awareness of WA's iconic dark night sky and its use as a valuable tourism asset.

| ACTIVITY | PARTNERS | TIMEFRAME |
|--|---|-----------|
| Provide information on astronomy, stargazing, astrophotography, light pollution, dark night sky protection and the value of tourism for local business via community stargazing events. | Local Govt | Ongoing |
| Mentor local tourism industry representatives on how best to assist visitors seeking dark night sky experiences. | Local Govt | Ongoing |
| Upskill and empower Visitor Centre and/or Community Resource Centre staff, volunteers and other interested community members by providing introductory knowledge on what can be seen in the night sky, where to access information, dark night sky protection and how to share this knowledge with others. | Local Govt | Ongoing |
| Connect local school students to STEM study, work experience and career pathways. | Local Govt | Ongoing |
| Foster Aboriginal Astronomy Enterprise and tourism business opportunities with connections to available support services. | TBC* | Ongoing |
| Pilot a partnering style business model that delivers sustainable Aboriginal Astrotourism experiences and contributes to a multi-layer economy. | TBC | 2020 |
| Deliver tourism, astronomy and astrophotography training to local enthusiasts to develop business capabilities in Astrotourism. | TBC | 2020 |
| Foster local tourism and tour operator business opportunities. | | Ongoing |
| Trial packaging astronomy-related events with accommodation and food with promotion to local Perth markets. | Local Govt, Community Resource Centres, Visitor Centres | 2019 |
| Highlight opportunities to potential Tourism Industry investors with the aim of raising the quality of accommodation, developing new businesses, attractions and services in regional WA. | TBC | Ongoing |

02 Position Western Australia as an international icon for world-class stargazing and astronomy related activities.

| ACTIVITY | PARTNERS | TIMEFRAME |
|---|------------------|-----------------------|
| Create a stargazing trail (Astrotourism Towns) through regional WA. | Local Govt | Commenced and ongoing |
| Select and promote dark night sky sites (Astrotourism destinations) to welcome visitors for stargazing, using telescopes and binoculars, astrophotography and astronomical activities. | Local Govt | Commenced and ongoing |
| Design and implement a digital map of Astrotourism destinations linked to local visitor service information, stargazing information, stories of the night sky and how the local community is protecting the night sky from light pollution and why that is important. | Local Govt | Completed |
| Astrotourism WA signage. | TBC | 2019 - 2020 |
| Launch Astrotourism Towns stargazing trail. | Local Govt | TBC |
| DL flyer for use in Visitor Centres in Astrotourism Towns. | Local Govt | Commenced and ongoing |
| Invest in partnership with Australia's Golden Outback. | Local Govt | 2019 and ongoing |
| Invest in partnership with Australia's Coral Coast and Australia's North West. | TBC | 2020 and ongoing |
| Electronic direct marketing to WA's local Astronomy and Astrophotography clubs and groups including any news and special events in towns of interest to the groups. | | Ongoing |
| Electronic direct marketing to International Astronomy and Astrophotography clubs and groups. | | Ongoing |
| Astrotourism WA Logo | | Completed |
| Astrotourism WA digital map, website domain and hosting. | | Completed |
| Create Astrotourism WA App to maximise e-commerce and visitation | TBC | 2020 |
| Astrotourism WA marketing content creation (video snapshots and imagery) embedded in destination marketing tools. | TBC | 2020 |
| Contribute to the development of "Star Tracks", a factual television series that engages audiences with WA's fascinating space science projects, the unique travel destinations where they are located and the characters involved. | Beam Me Up Media | TBC |
| Design world's longest virtual solar system drive according to seasonality and entrance/exits from Perth (inner solar system) and Broome (outer solar system). | TBC | 2020 |
| Seek funding to implement virtual solar system drive to value add to the visitor tourism experience and build destination visitation. | TBC | 2020 |
| Build virtual solar system drive. | TBC | 2021/22 |
| Investigate Aboriginal Astronomy constellation documentation and subsequent artistic interpretations in preparation for commercialisation and retail ready tourism souvenir sales. | TBC | 2020 |
| Expand Astrotourism Towns and stargazing trail to Gascoyne, Pilbara and Kimberley regions. | TBC | From 2020 |
| Develop a business case to determine economic value of the 2023 Ningaloo Total Solar Eclipse to Western Australia. | Astronomy WA | 2019 |
| Prepare 2023 Ningaloo Total Solar Eclipse Strategic and Operational Plans to leveraging best economic and marketing outcomes for WA. | Astronomy WA | 2021 |
| Implement 2023 Ningaloo Total Solar Eclipse Operational Plan and deliver event activities. | Astronomy WA | Mar-May 2023 |

03

Facilitate the protection of Western Australia's dark night sky.

| ACTIVITY | PARTNERS | TIMEFRAME |
|--|----------------------------------|-----------|
| Raise awareness of artificial light pollution and WA's pristine dark night sky. | | Ongoing |
| Seek funding for a study to estimate the economic value of Astrotourism for WA's regional tourism industry. | TBC | 2020 |
| Measure and record dark sky quality at Astrotourism destinations using a Sky Quality Metre. | | Ongoing |
| Draft a template Lighting Management Policy that can be used to maintain and improve the quality of the dark night sky in order to develop Astrotourism. | Local Govt | Completed |
| Adoption of Lighting Management Policy. | Local Govt | Ongoing |
| Implement Lighting Management Policy for best practice artificial light pollution reduction. | Local Govt | Ongoing |
| Raise awareness and influence bright light users to shield and protect the dark night sky. | TBC | Ongoing |
| Raise awareness of the International Dark-Sky Association's International Dark-Sky Places Program that provides processes for accreditation. Advise on benchmark light audits and application processes for international accreditation. | | 2019 |
| Create WA's first International Dark-Sky Place on the Astrotourism stargazing trail. | TBC | 2022 |
| Liaise with the WA Local Government Association's (WALGA) Transition to LED Street Lighting Working Group and power service providers to raise awareness and encourage implementation of best practice artificial light pollution reduction. | WALGA, Western Power, Local Govt | Ongoing |
| Investigate external funding options and identify partners for a dark-sky friendly LED street lighting pilot project in an Astrotourism Town. | TBC | 2020 |
| Seek external funding to implement a dark-sky friendly LED street lighting pilot project in an Astrotourism Town. | TBC | 2021 |



REFERENCES/DEFINITIONS

¹Fabio Falchi et al. Science Advances 2016;2:e1600377, <http://advances.sciencemag.org/content/2/6/e1600377>, accessed 4 January 2019

²Australian Bureau of Statistics 2018, 1410.0 - Data by Region, 2012-17, Canberra ACT

³<http://www.darksky.org/five-years-of-satellite-images-show-global-light-pollution-increasing-at-a-rate-of-two-percent-per-year/>

⁴<http://www.bom.gov.au/watl/sunshine/>

⁵Department of Jobs, Tourism, Science and Innovation (May 2018), Space Industry Capability in Western Australia, Perth

⁶Mitchell, D.; Gallaway, T. (2014) Estimating the potential economic value of the night skies above the Colorado Plateau. <http://www.wyomingstargazing.org/wp-content/uploads/2018/02/Economic-Impact-of-Dark-Skies-on-the-Colorado-Plateau.pdf>

⁷Tourism WA - Strategy and Research (December 2018), Domestic Visitation – Fast Facts Year Ending September 2018, Perth

⁸Outcomes are SMART if they are specific, measurable, achievable, realistic and timely (or time-bound).

⁹SME is defined as small and medium-sized enterprises.

¹⁰MICE is defined as larger groups of business travellers brought together by meetings, incentives, conferences and exhibitions.



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