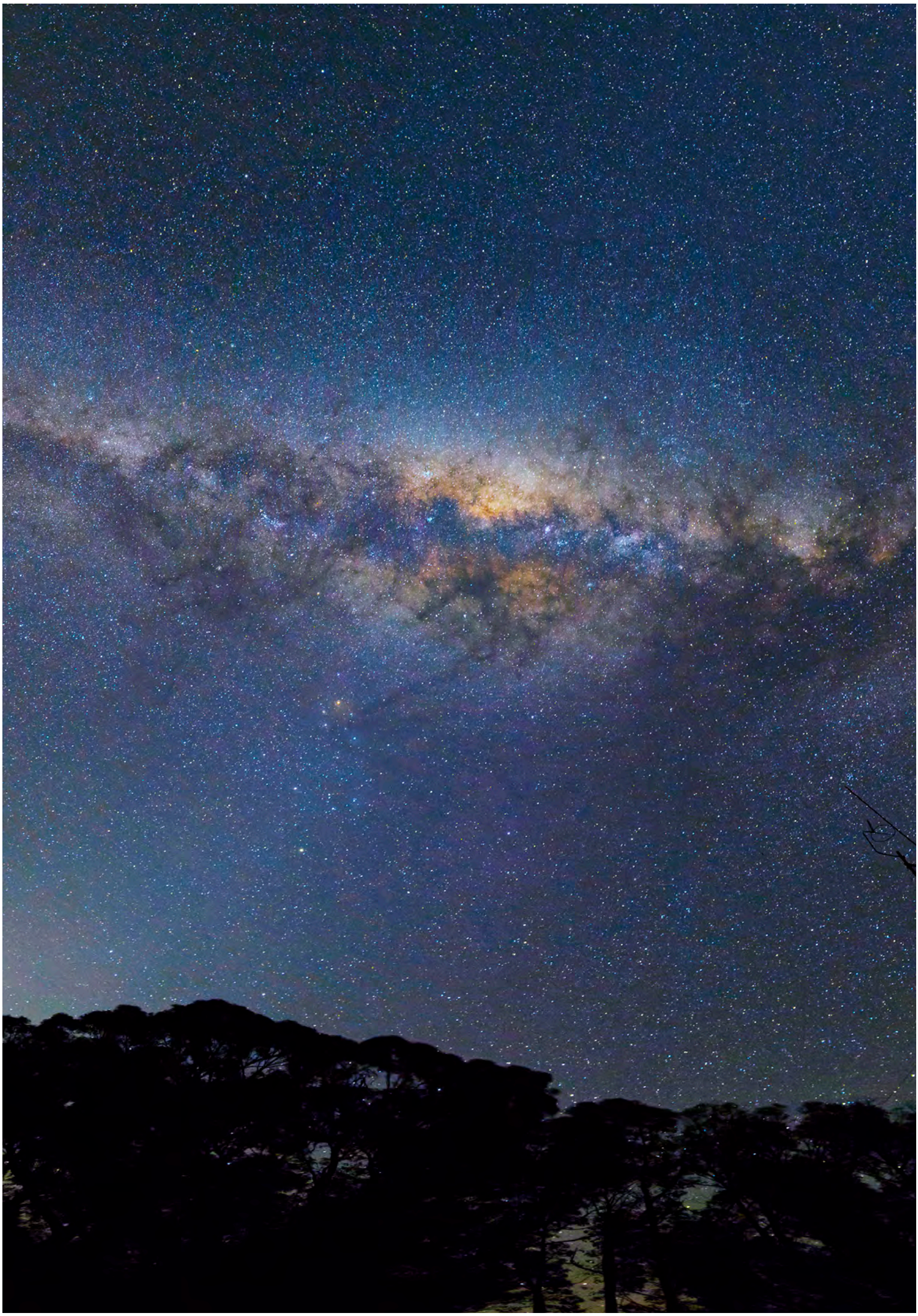


Dark Sky Park Submission

Warrumbungle National Park

Table of Contents

Letter Of Nomination

AUSTRALIAN ASTRONOMICAL OBSERVATORY
Siding Spring Observatory
Coonabarabran, NSW 2357, Australia
Mobile: +61 420 897 860
Facsimile: +61 2 9372 4860
Email: fgw@aao.gov.au

Professor Fred Watson, AM
Head of Lighting and Environment

21 December 2015

IDA Board of Directors
International Dark-Sky Association
3225 North First Avenue
Tucson, Arizona 85719-2103, USA

Dear IDA Board of Directors,

Proposed Warrumbungle Dark Sky Park

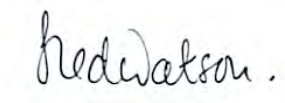
Please accept this document as the submission of the Warrumbungle Dark Sky Park Committee to have the Warrumbungle National Park in New South Wales, Australia, recognised as a Dark Sky Park (DSP). As Chair of the Committee, and a member of IDA, I am delighted to be able to submit the nomination.

Already in an area greatly appreciated for its dark sky qualities, the Warrumbungle National Park (WNP) is a good fit to the requirements for DSP status. The Park shares a boundary with Australia's national optical astronomy facility at Siding Spring Observatory, and the consequent legislative protection of the night sky ensures that no significant illuminated development can take place. The Dark Sky Park Committee has worked closely with the neighbouring Shires, and the NSW Department of Planning and Environment to uphold these stringent lighting measures.

The promotion of the Warrumbungle area as a Dark Sky Park would contribute to the long-term continuation of both the area's pristine skies and the work of the surrounding communities in maintaining strict environmental planning. Recognition, not only as Australia's first Dark Sky Park, but one at Gold Tier status, would be welcomed with great pride.

In making this application, we also foreshadow a further submission within the next 12 months to extend the DSP to include Siding Spring Observatory itself.

Yours sincerely,



Fred Watson,
Chair, Warrumbungle Dark Sky Park Committee

Warrumbungle Dark Sky Park Committee:

- Professor Fred Watson AM,

Head of Lighting and Environment, Australian Astronomical Observatory (Chair)

- Mr Mark Fosdick,

Area Manager, Coonabarabran, NSW National Parks and Wildlife Service

- Ms Marnie Ogg,

Manager, Sydney Observatory, Museum of Applied Arts and Sciences (Coordinator)

- Mr Peter Verwayen,

Electronics Tech, Research School Astronomy and Astrophysics, Australian National University

- Mr Reginald Wilson,

Principal, Lighting Analysis and Design, Sydney

The Dark Sky Proposal is submitted on behalf of:

- Warrumbungle National Park – NSW National Parks and Wildlife Service
- Australian Astronomical Observatory
- Research School of Astronomy & Astrophysics, Australian National University
- Coonamble Shire Council
- Gilgandra Shire Council
- Warrumbungle Shire Council
- NSW Department of Planning and Environment, Dubbo

Acknowledgements

The Warrumbungle Dark Sky Park Committee would like to thank the following for their assistance in preparing this submission:

Matthew Colless (Director of the Research School of Astronomy and Astrophysics of the Australian National University), Warrick Couch (Director of the Australian Astronomical Observatory), Michael Wright (Deputy Chief Executive, NSW National Parks and Wildlife Service) and the members of the Siding Spring Observatory Dark Sky Committee for their support of the project; Ángel López-Sánchez, David Malin and Peter Small for images and maps; William Watson, Steven Lee and Douglas Gray for assistance with night-sky brightness measurements; Mandy Eggins for poster design and artwork; and Stephen Turner for website design.

The executive members of the Warrumbungle Dark Sky Park Committee also wish to acknowledge the enormous contribution made by the Project Coordinator, Marnie Ogg, in initiating this document, and facilitating much of the work required to bring the Warrumbungle National Park to the required level of compliance. Lastly, we thank John Barentine of IDA for his invaluable guidance in finalising the submission.

***Cover Image**:* Mosaic of the Galactic Centre over the Warrumbungle National Park by Ángel López-Sánchez.

Eligibility Overview

IDSP Program Criteria	Compliance Status	See pages:
A) All protected public lands, whether managed by national, state, provincial, or local agencies, are eligible	Warrumbungle National Park is managed by the state agency the NSW National Parks and Wildlife Service under the *National Parks and Wildlife Act 1974 (NSW)*	11ff and 67ff
B) The park must provide the opportunity for public night time access, with or without supervision. Regular visitation by the public is essential to meet the goals of the IDSP program. A portion of designated land may meet this requirement, or access must be available for a portion the night.	The Warrumbungle National Park is open 24 hours a day, 365 days a year without supervision (except during periods of extreme and catastrophic fire danger, when the park is closed.)	11
C) The park must provide an exceptional dark sky resource, relative to the communities and cities that surround it. Core night sky quality must fit in one of the three tier qualifications Gold, Silver, or Bronze.	The Warrumbungle National Park and surrounding shire councils currently comply with the Orana Regional Environmental with stringent lighting controls. Sky quality monitoring frequently takes place at Siding Spring Observatory – Australia's national optical observatory	25-34
MINIMUM REQUIREMENTS		
A) A quality comprehensive Lightscape Management Plan (LMP)	Included in this application	30-34
B) The park's commitment to dark skies and lightscape management	Included in this application	30-34
C) The park's commitment to public education	Included in this application	16-24

	AREA	COMPLIANCE	PAGE
A	Map(s) of area to be designated	Yes	15, 25-26
B	Letter of nomination from a qualified IDA member nominator.	Yes - Fred Watson	5
C	Letter of support from appropriate Park administrator	Yes – Michael Wright	44
D	Any management documents supporting dark skies and/or natural lightscapes as a valued resource.	Warrumbungle National Park Management Plan 2012	104
E	If it exists, agency/departmental/municipal policy on outdoor lighting and Dark Sky Park Designation Guidelines.	Orana Regional Environmental Plan (REP)	30
F	Documentation of sky quality, light pollution measures, satellite pictures, maps, photographs, or other evidence that demonstrates the noteworthiness of the resource.	Yes	25-28
G	Lightscape Management Plan	Yes	30
H	Documentation signed by park administrator showing a Lighting Inventory of the park and a plan to bring 90% of outdoor lighting into compliance with the IDA within five (5) years.	Yes	35, 44
I	Description of a restoration project	Yes	35-42
J	Description of interpretive program or interpretive products related to dark skies/natural darkness	Yes	19-23
K	Future plans	Yes	24
L	Proposed alternative wording for DSP (e.g. Dark Sky Wilderness, Dark Sky Refuge, etc.), if desired.	NA	
M	If the candidate DSP is a privately held property,	NA	

Warrumbungle National Park History And Information

Warrumbungle National Park Overview

Warrumbungle National Park (WNP) began with a proposal in 1936 to reserve the more scenic parts of the Warrumbungle Range as the *Warrumbungle National Monument*. The area was first proclaimed as a reserve in 1953 and transferred to the National Parks and Wildlife Service in 1967.

It was heritage listed on 15 December 2006, in recognition of its geological and biological values. The park covers an area of 23,312 hectares and is located between the towns of Coonabarabran, Gilgandra and Coonamble on the north-west slopes of New South Wales. The WNP is managed by the NSW state agency the NSW National Parks and Wildlife Service under the *National Parks and Wildlife Service ACT 1974 (NSW).* There are no private holdings within the boundary of the proposed dark sky park.

Siding Spring Observatory is the premier facility on the Australian mainland for optical and infrared astrophysics research. Located on a site adjoining the Warrumbungle National Park, it is home to several world-leading telescopes

The combination of the arid western plains, moist eastern slopes and elevation above the surrounding plains, provide a haven for a high number of species. A biodiversity hotspot, the park provides an important habitat for over 520 species of native plants and 311 species of native animals. Wattles and small inland trees dominate the drier western slopes; cooler conditions of the sheltered southern and eastern areas are perfect for forests of taller trees and other moisture loving vegetation, such as ferns and orchids can be found in the gullies.

The eastern grey kangaroo, emus and wallabies are seen regularly. Other visitors include the pobblebonk burrowing frog, wedge-tailed eagle, sulphur crested cockatoo, red-rumped parrot, and rarer animals like the brush-tailed rock wallaby, superb parrot and regent honeyeater.

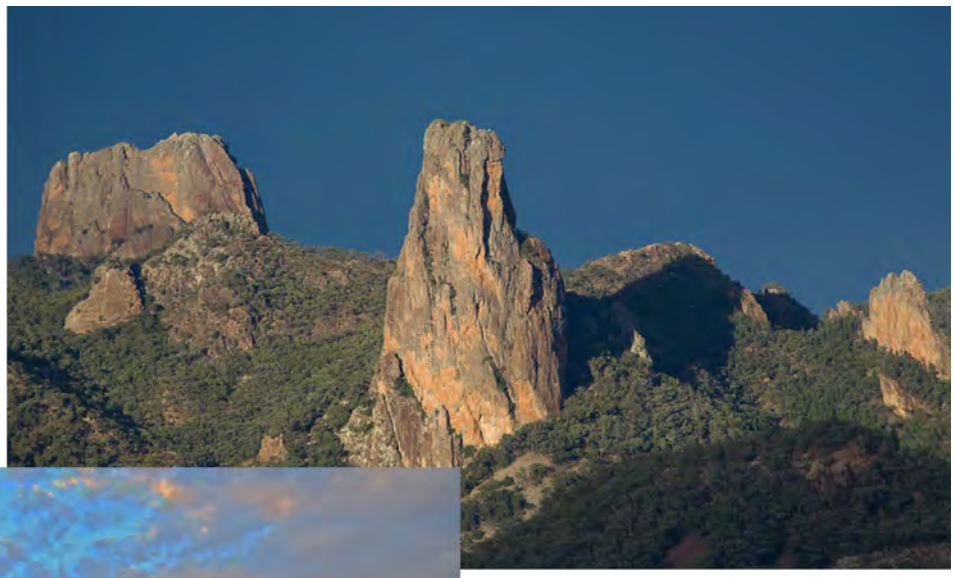
Archaeological evidence indicates that Indigenous people have occupied the Warrumbungles for at least 20,000 years. The name 'Warrumbungle' comes from the Gamilaraay language, and is believed to mean 'crooked mountains'. Rock shelters and sites of significance to the Gamilaraay and Weilwan Aboriginal people raise the park to an area of significant cultural heritage value.

In addition to the observatory, the park is surrounded by rural properties. Cattle grazing, wool and cereal crops are the important local agricultural industries. The park straddles three local government areas, Warrumbungle Shire to the east, Gilgandra Shire to the south and Coonamble Shire to the west. Nearby cities and towns include:

- Sydney (350km)
- Coonabarabran (20 km the nearest town)
- Gilgandra (64km)
- Coonamble (73km)
- Dubbo (118 km)

Warrumbungle National Park has attracted bushwalkers and rock climbers from Australia and around the world to the area for over 70 years. Today, thousands of people visit the park annually and economic studies have shown the park already has a significant beneficial impact on the local Coonabarabran economy.

The Warrumbungle National Park is still recovering from the Wambelong bushfire of 13 January 2013, which devastated 55,000 hectares of the Park and adjoining properties.




Eagles Pass

Warrumbungle National Park Management Plan

The Warrumbungle National Park is a national heritage-listed park. The Park's current Management Plan from the NSW National Parks and Wildlife Service (NPWS) is attached at p.67.

Warrumbungle National Park Heritage-List Values

Warrumbungle National Park protects an area of isolated, rugged mountains at the upper reaches of the Castlereagh River Catchment. The geology, landform, climate, plants, animals, past use by Aboriginal people and early European settlers and bushwalkers, define the values of the park and the reasons for its inclusion on the National Heritage List.

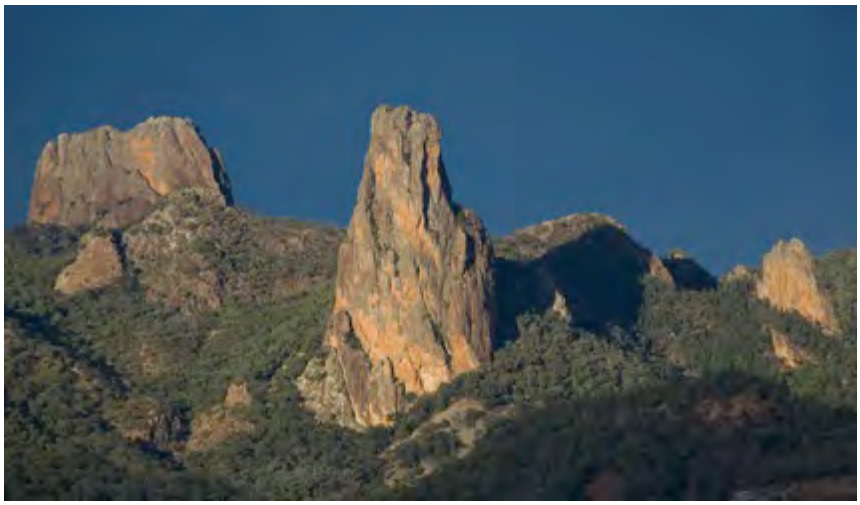
Under section 30E of the *National Parks and Wildlife 1974 (NSW),* national parks are managed to:

- conserve biodiversity, maintain ecosystem functions, protect geological and geomorphological features and natural phenomena and maintain natural landscapes;
- conserve places, objects, features and landscapes of cultural value;
- protect the ecological integrity of one or more ecosystems for present and future generations;
- promote public appreciation and understanding of the park's natural and cultural values;
- provide for sustainable visitor or tourist use and enjoyment that is compatible with conservation of natural and cultural values;
- provide for sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to conservation of natural and cultural values; and
- provide for appropriate research and monitoring.

In addition, the NSW National Parks and Wildlife Service has undertaken to allow public access to the Warrumbungle National Park 24 hours per day, 365 days per year, without supervision (except during periods of extreme and catastrophic fire danger, when the Park is closed.)

These values directly correlate with the International Dark Sky Park (IDSP) compliance of "a land possessing an exceptional or distinguished quality of starry nights and a nocturnal environment that is specifically protected for its scientific, natural, educational, cultural heritage, and/or public enjoyment"

WARRUMBUNGLE NATIONAL PARK SPECIFIC VALUES



• Geological, Landscape/Catchment Values:

Warrumbungle National Park is a spectacular landscape shaped by an ancient volcano eroded over millions of years.

• *Biological Values:*

Over 520 species of native plants and 311 species of native animals have been recorded in Warrumbungle National Park. The park provides a refuge for the endangered brush-tailed rock-wallaby (*Petrogale penicillata*) and a great diversity of plant and animal life.

• *Aboriginal Heritage Values:*

Archaeological research into rock-shelters in the Warrumbungle area has shown the presence of Aboriginal people for at least 20,000 years. The physical presence of the mountains looms large in the cultural identity of local people.

• *Historic Heritage Values:*

The spectacular scenery of the Warrumbungle Mountains had attracted the attention of bushwalkers by the 1930s. Some of the walking tracks in the park date from the establishment of the park in the 1950s and now have heritage value.

• *Recreation Values:*

The park is a popular venue for bushwalking, camping and rock climbing. Walking tracks like the Grand High Tops circuit are widely recognised as iconic bushwalks in New South Wales. The park is a key regional attraction for tourists. Annual visitation to the park is approximately 35,000 visitors. It is promoted by the tourism industry locally and regionally.

• *Research/Education Values:*

The park has been used by universities for geological and biological studies. Its geology has been progressively researched and is the subject of several publications. Since 1991, the Department of Education and Training has been operating an environmental education centre in the park for school students.

HISTORY OF SIDING SPRING OBSERVATORY

Image Australian National University

Located 27kms west of Coonabarabran, and adjacent to the Warrumbungle National Park, is Siding Spring Observatory, Australia's largest optical astronomy research facility.

The history of Coonabarabran's connection with astronomy began in the 1950's when the Australian National University's Research School of Astronomy and Astrophysics began searching for a location to house their new telescopes. After testing sites all over Australia, a site within the Warrumbungle Ranges was chosen as having the most favourable combination of conditions:

- high elevation (1160 metres above sea level),
- low humidity,
- a non-turbulent atmosphere for viewing clarity,
- clean air,
- exceptionally dark skies
- plus an average of 70% of night skies clear.

Today there are some 30 telescopes dotted around the original chosen site. Professional astronomers come from all over the world visit Siding Spring Observatory to probe the mysteries of the night sky and compete for time to use the telescopes. Past projects have included mapping the entire southern hemisphere sky, discovering new planets around other stars and identifying Near Earth objects (asteroids and comets).

Principal Active Telescopes

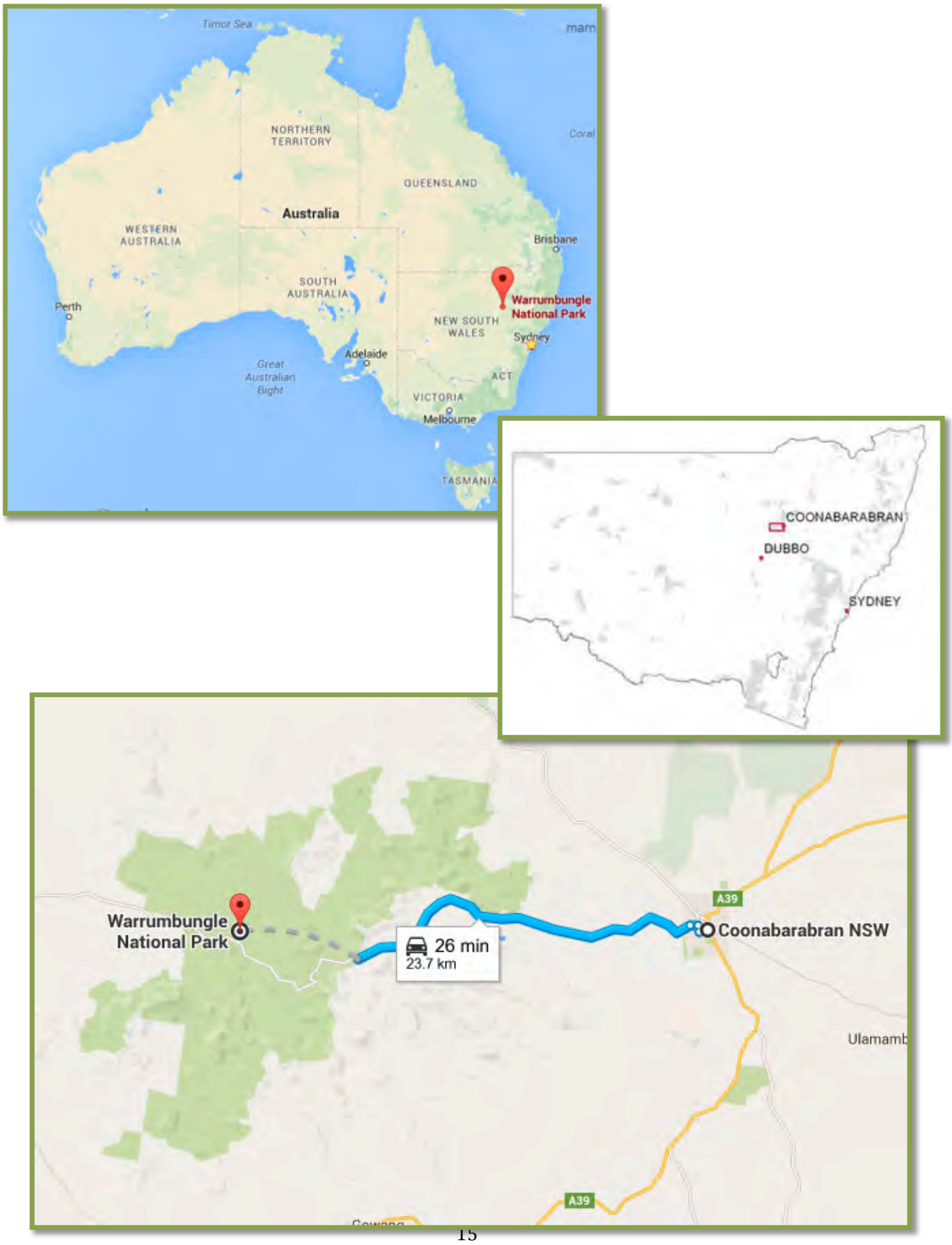
- 3.9m Anglo-Australian Telescope
- ANU 2.3m Telescope
- 1.3m SkyMapper telescope
- 2.0m Faulkes Telescope South
- Hot Jupiters in the Southern Sky: The HAT-South Project
- iTelescope.Net (20 small telescopes)
- Robotic Optical Transient Search Experiment (ROTSE)
- Solaris Telescope
- 1.2m United Kingdom Schmidt Telescope (UKST)
- 2.0m KMTNet Microlensing telescope

Decommissioned Heritage Telescopes

- ANU 16 inch Boller & Chivens Telescope
- ANU 24 inch Boller & Chivens Telescope
- ANU 40 inch Boller & Chivens Telescope
- UNSW Automated Patrol Telescope (APT)
- Uppsala 0.5m Schmidt Near Earth Object Survey Telescope

Star trails around the dome of the Anglo-Australian Telescope in moonlight. (Ángel R. López-Sánchez)

PARK LOCATION AND MAP



WARRUMBUNGLE DARK SKY PARK PUBLIC EDUCATION

The WNP, Warrumbungle Dark Sky Committee and surrounding Shire councils have undertaken the following outreach activities during 2015.

Event/operated by	Where	Dates	What
Crooked Mountain Concert **Warrumbungle National Park**	Coonabarabran	Saturday, November 8, 2015	Exhibition Boards, DVD Presentation and flyers. Short talk on light pollution and dark skies during concert
StarFest Open Day Festival **(ANU / AAO)**	Siding Spring Observatory	Friday 2 - Sunday 4 October	Exhibition Boards, DVD presentation and flyers. Information booth set up in main telescope
StarFest Open Day Dark Sky Park Talk by Fred Watson, AAO	Siding Spring Observatory	Sat 3 October	30 min Lecture on Dark Skies
Bok Lecture **(ANU / AAO)**	Coonabarabran	Sunday 4 October	Exhibition Boards, DVD presentation and flyers
Science in the Pub **(ANU / AAO)**	Coonabarabran	Friday 2 October	Educational boards, flyers, Dark Sky Park images
Science Expo **(ANU / AAO)**	Dubbo	Sat 10 October	Educational boards, flyers, Dark Sky Park images, info booth
Warrumbungle National Park	National Park	Permanent	Educational boards, Flyers to campers.
Australian Geographic Members	Nationwide	Annual	Discounted entry to SSO Visitors Centre on showing membership and mentioning the Dark Sky Park

It is intended that all these events and information programs will continue over the next five years. Dates to be confirmed.

EVENT EXAMPLES -WARRUMBUNGLE NATIONAL PARK

Seasonal programs exist in the National Park, and will incorporate the DSP Status and the term 'Dark Sky'. The following events currently exist in the national park and are planned to continue.

STARRY NIGHT

Experience the wonders of star gazing and learn all about astronomy, as the experienced CoonaAstraVentures take you on a journey into space under the mesmerizing Warrumbungle night sky. Find constellations, planets, the Southern Cross and listen to night sky stories. Nearby Coonabarabran is known as the 'Astronomy capital of Australia' and Warrumbungle National Park is the ultimate place to see infinite stars.

Date: Wed 8th April 2015, 6.30PM
Wed 15th April 2015, 6.30PM
Frid 17th April 2015,6.30PM
Grade: Easy
Meet: Details on booking
Cost: Adult $15 per person. Concession $10 per person. Child $8 per person. Family $40 for two adults and two children.
Bring: Sturdy footwear, warm clothes, torch, chair and water

Bookings essential (02) 68254364

STARS & CAMP OVEN DELIGHTS

Experience the wonders of star gazing and learn all about astronomy, as the experienced CoonaAstraVentures take you on a journey into space under the mesmerizing Warrumbungle night sky. Find constellations, planets, the Southern Cross and listen to night sky stories. Nearby Coonabarabran is known as the 'Astronomy capital of Australia' and the Warrumbungle National Park is the ultimate place to see infinite stars. Enjoy a delicious camp oven supper of damper with a comforting hot cuppa, all whilst sitting around a warm camp fire.

Date: Saturday 11th April 2015 – 6.30PM (8.00PM supper)
Grade: Easy
Meet: Details on booking
Cost: Adult $20 per person. Concession $15 per person. Child $10 per person. Family $50 for two adults and two children.
Bring: Sturdy footwear, warm clothes, torch & chair.

Bookings essential (02) 68254364

LOOKING FORWARD - 5 YEAR FUTURE OUTREACH EVENTS

The *Crooked Mountain Concert* is an annual music concert run since 2003 by the NPWS to celebrate and promote the park and its values. The concert date has historically been on the first or second Saturday in November to give consistency in terms of the regional tourism calendar and scheduling for visitors. The date may be adjusted but it is required to optimise visitation, be outside of school holiday period and the peak fire season (i.e. not later than mid-November), but not while the weather is too cold (i.e. not before mid-September), and not in conflict with other regional events. At this stage it is intended to proceed with the concert on the first or second weekend of November. Three out of the next five Crooked Mountain Concerts will fall on or very near full Moon.

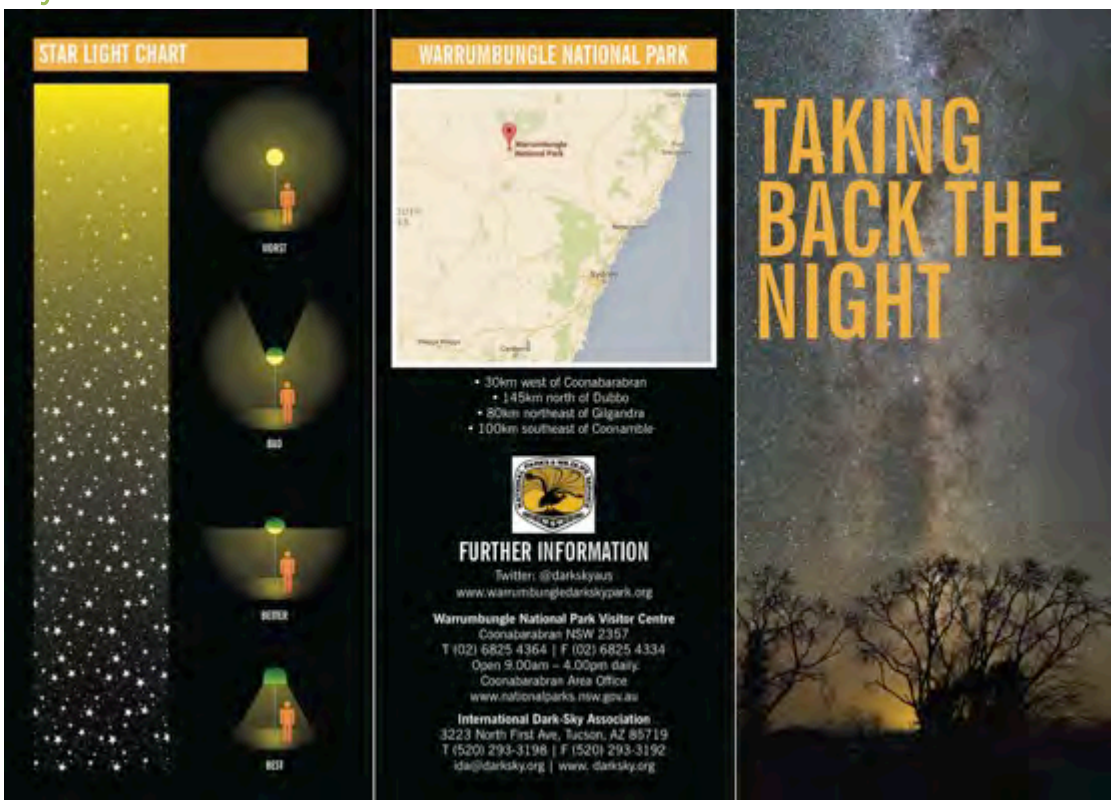
The *Starfest Weekend* is, like the Crooked Mountain Concert, a long-established highlight in the calendar of the Warrumbungle Shire. The three events noted on p.16 (Starfest Open Day, Bok Lecture, Science in The Pub) will continue at least for the next five years, and will incorporate the Dark Sky publicity elements mentioned in the table.

The *Dubbo Science Expo* is an annual event, and will continue to feature a Dark Sky information booth with educational boards and flyers.

CROOKED MOUNTAIN CONCERT, 2015

EXAMPLES OF OUTREACH MATERIALS

Flyer



Poster boards

TYPES OF
LIGHT POLLUTION

SKYGLOW
Light that escapes upward from unshielded light fixtures or lights that are indiscriminately aimed upwards. This light is completely wasted, scattering in the atmosphere creating skyglow. In particular, growing skyglow is compromising the effectiveness of many of the world's great astronomical observatories.

LIGHT TRESPASS
Uncontrolled light that spills outside the area that it is intended to illuminate and onto neighbouring properties. This often creates a nuisance, detracts from amenity and wastes energy and money.

GLARE
Often street lights, carpark and security lights are chosen and installed with little consideration for efficiency and aiming. Glare from these lights can shine directly into the eyes creating discomfort. This can make it difficult for the eye to adjust effectively to changing levels of illumination thereby compromising night vision.

WARRUMBUNGLE
DARK SKY PARK
@darkskyaus | www.warrumbungledarkskypark.org

THE NIGHT SKY
IS PART OF OUR COMMON HERITAGE

Until recently our ancestors experienced a night sky brimming with stars that inspired science, religion, philosophy, art and literature.

History, scientific discovery and human curiosity are indebted to the natural night sky. Without the natural night sky we could not have:

- navigated the globe
- walked on the moon
- learned of our expanding universe
- discovered humans are made of stardust

Several Indigenous groups in Australia have stories about the dark cloud next to the Southern Cross - the Coalsack. To them the great emu's head appears in the Coalsack, and its neck, body, and legs are formed from the dust lanes stretching along the Milky Way.

Take a look for the "Emu in the Sky" on a dark autumn night. Once you've seen it, the Milky Way will never look the same again.

Image: Kylie Pickett / Shared Sky

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BRIGHTER
DOES NOT MEAN SAFER!

OUTDOOR LIGHTING
Outdoor lighting is supposed to enhance safety and security at night, but too much light is wasteful and even harmful.

GLARE
Glare from bright, unshielded lights actually decreases safety. Glare shines into your eyes, constricting your pupils. This diminishes their ability to adapt to low-light conditions.

"DARK SKY" DOES NOT MEAN "DARK GROUND"!

CRIME
There is no clear scientific evidence that increased outdoor lighting deters crime. It makes us feel safer, but bad outdoor lighting can actually reduce safety.

SMART LIGHTING
Smart lighting that directs light down, where it is most useful, creates a balance between safety and starlight.

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LIGHT POLLUTION
WASTES ENERGY AND MONEY

NEARLY ALL ELECTRICITY IN AUSTRALIA IS GENERATED BY BURNING FOSSIL FUELS.

Light pollution in South Australia alone, costs over $5 million dollars, and produces more than 70,000 tons of carbon dioxide emissions. Saving the greenhouse emissions from this light pollution would be the equivalent of taking 10,000 cars off the roads.

The cost worldwide runs into billions of dollars and millions of tonnes of greenhouse emissions. Most bad lighting installations can be remedied by carefully considering what needs to be illuminated and installing energy efficient, properly shielded light fixtures for the purpose.

The cost of changing over to shielded, efficient light fixtures for business, security and public lighting in most instances could be recovered in just a few years.

WARRUMBUNGLE
DARK SKY PARK
@darkskyaus | www.warrumbungledarkskypark.org

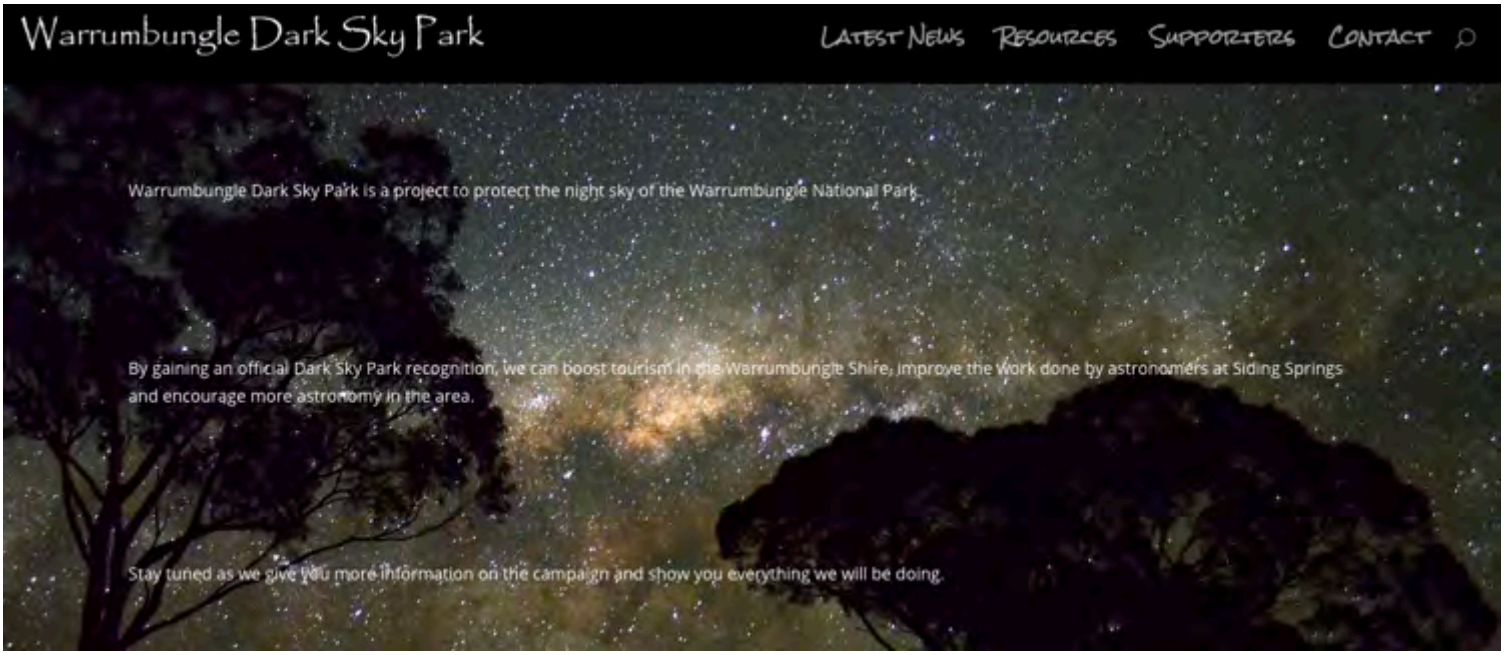
DVD

A video loop of the following presentations is played continuously at the Siding Spring Observatory Visitor Centre and during events in the National Park and Coonabarabran.

https://www.youtube.com/watch?v=_nlFcEj41Xk
https://www.youtube.com/watch?v=dd82jaztFIo

Dark Sky Park Website

www.warrumbungledarkskypark.org



Twitter

@darkskyaus

Media Coverage 2015

- Liz Cutts Coonabarabran Times – 9 July, 2015 (attached)
- Dugald Saunders ABC Western Plains – 29 June, 2015
- Fred Watson with Simon Marnie ABC 702 radio – 2 August, 2015
- Andrew Dunkley ABC Western Plains – 15 July, 2015
- The End of Darkness (Australian Geographic Magazine, January 2015)
- Fred Watson, ABC Science Show, 27 December 2015

FUTURE OUTREACH OPPORTUNITIES

Dark Sky Communication Award
– Sponsored by the Australian Astronomical Observatory.

This competition, managed by the Warrumbungle Dark Sky Park Committee, asks an individual or team of no more than four, 12-15 year old school students to present the science behind on a nominated light pollution related subject with a video presentation. Each year a topic would be chosen and could include topics such as:

What is Light Pollution?

What has the night sky contributed to the Australian Heritage?

Water, Air, Land. Why consider light pollution?

Why preserve the night sky?

Explain Sky glow.

The most creative, scientifically correct prize will win money and enjoy a visit to the Anglo-Australian Telescope.

The winning video presentation will then be:

- uploaded to the Dark Sky Park website
- used throughout the year in the Exploratory or at events during the year.

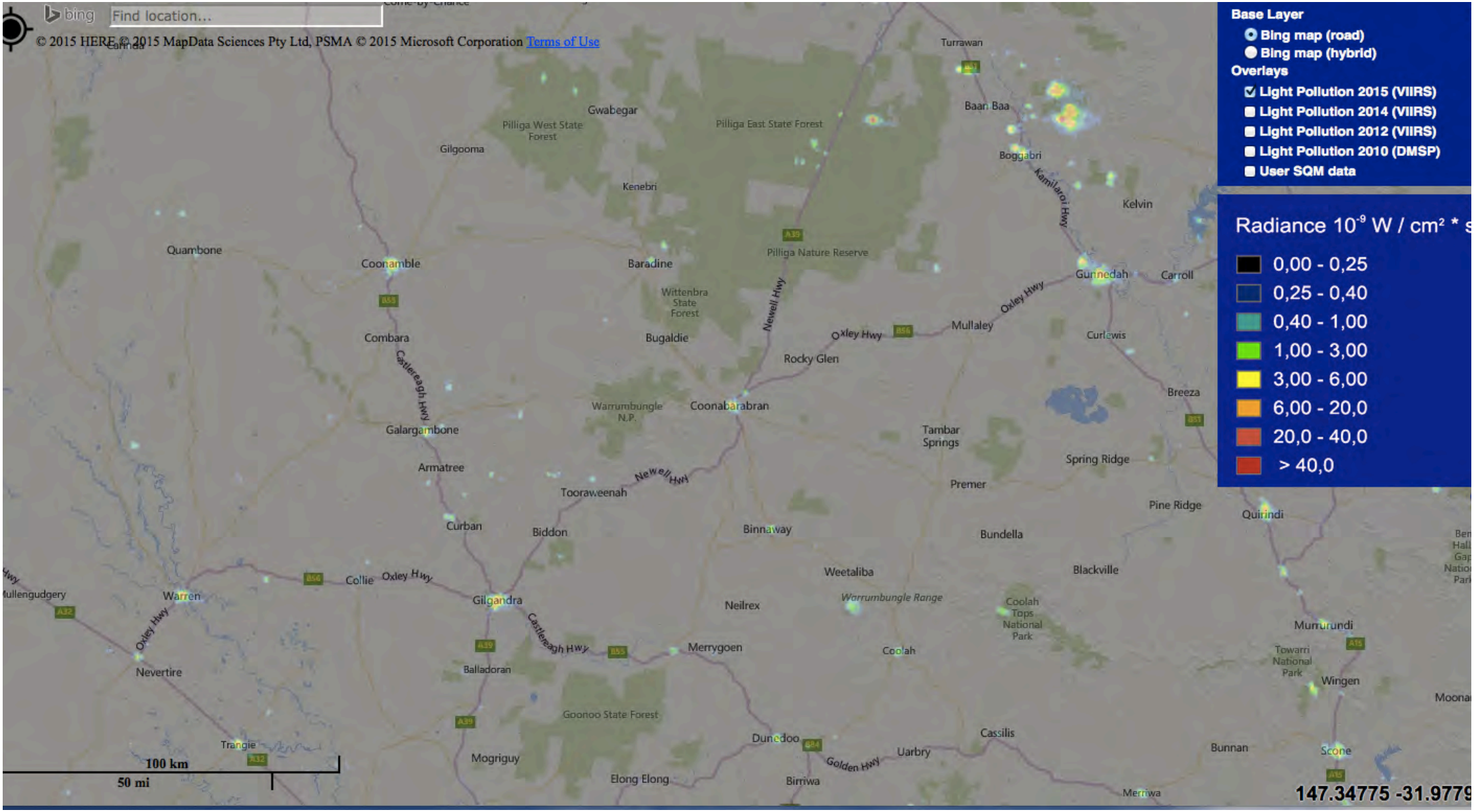
The winner, chosen by a judging panel including representatives of the Siding Spring Observatory Dark Sky Committee and surrounding Shire Councils, will be hosted for a visit to Coonabarabran and announced at StarFest.

WARRUMBUNGLE NATIONAL PARK DARK SKY QUALITY

Satellite Night Images

Below: Low resolution (uncalibrated) Landsat image of south-eastern NSW superimposed over a Bing map. Siding Spring Observatory and the Warrumbungle National Park are near the top edge. The line-of-sight distance to the Sydney metropolitan area is 350km.

Following page: Calibrated high-resolution VIIRS satellite image of central NSW, centred on the Warrumbungle National Park. Light pollution from the Boggabri coalfield can be seen to the north of Gunnedah (upper left) at a distance of some 150 km from the Warrumbungle National Park.


Find location...
© 2015 HERE © 2015 MapData Sciences Pty Ltd, PSMA © 2015 Microsoft Corporation Terms of Use
Base Layer
Bing map (road)
Bing map (hybrid)
Overlays
Light Pollution 2015 (VIIRS)
Light Pollution 2014 (VIIRS)
Light Pollution 2012 (VIIRS)
Light Pollution 2010 (DMSP)
User SQM data
Radiance 10-9 W / cm² * s
0,00 - 0,25
0,25 - 0,40
0,40 - 1,00
1,00 - 3,00
3,00 - 6,00
6,00 - 20,0
20,0 - 40,0
> 40,0
Turrawan
Baan Baa
Gwabegar
Pilliga West State Forest
Pilliga East State Forest
Gilgooma
Boggabri
Kenebri
Kamilaroi Hwy
Kelvin
Quambone
Coonamble
Baradine
Pilliga Nature Reserve
Gunnedah
Carroll
Wittenbra State Forest
Newell Hwy
Oxley Hwy
Mullaley
Combara
Bugaldie
Curlewis
Rocky Glen
Castlereagh Hwy
Breeza
Warrumbungle N.P.
Coonabarabran
Galargambone
Tambar Springs
Armatree
Spring Ridge
Premer
Tooraweenah
Pine Ridge
Quirindi
Curban
Biddon
Binnaway
Bundella
Collie
Weetaliba
Blackville
Warren
Gilgandra
Neilrex
Warrumbungle Range
Coolah Tops National Park
Murrurundi
Nevertire
Merrygoen
Coolah
Towarri National Park
Wingen
Balladoran
Goonoo State Forest
Dunedoo
Cassilis
Trangie
Mogriguy
Uarbry
Bunnan
Scone
Golden Hwy
Elong Elong
Birriwa
Merriwa
100 km
50 mi
147.34775 -31.9779

WARRUMBUNGLE NATIONAL PARK NIGHT SKY

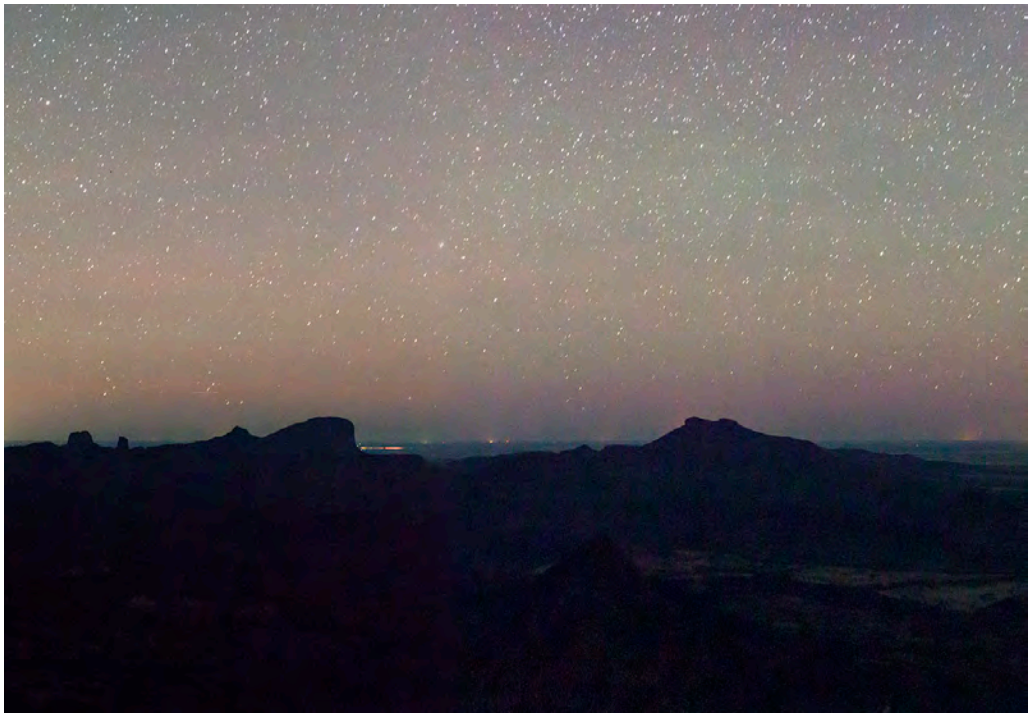
Warrumbungle National Park Sky Quality Measurements

	LOCATION	SQM 7.11.15 F.Watson (mag/sq") ±0.10	AMB. TEMP. (°C)	SQM 11.1.16 W.Watson (mag/sq") ±0.10	AMB. TEMP. (°C)
1	Park East Entry	21.76	16	21.72	30
2	White Gum Lookout	21.72	16	21.77	29
3	1 km from Old Visitor Centre	21.79	15		
4	Old Visitor Centre	21.79	16	21.84	29
5	Camp Blackman	21.75			
6	50m from Camp Blackman Amenities Block	21.75	15		
7	Camp Blackman Amenities Block (*artificial light contamination present*)	20.68	15		
8	Telstra Phone Box, Camp Blackman (*artificial light contamination present*)	20.54	15		
9	Canyon Camp	21.80	15	21.83	28
10	Crooked Mountain Site	21.79		21.76	29
11	Camp Pincham	21.77		21.76	28
12	Camp Wambelong	21.79	16		
13	Park Western Entrance	21.75			

All measurements listed above were made in moonless conditions with handheld Unihedron Sky Quality Meters (SQMs) that had been calibrated against two similar instruments. Two different SQMs were used for the two sets of readings; the main set on 7 Nov. 2015 and an additional subset on 11 Jan. 2016. Measurements were made as close to the zenith as possible, avoiding the Milky Way, Gould's Belt, and other areas contaminated by bright stars.

Note that measurements made with a permanently mounted zenith-pointing SQM located at the north-eastern boundary of the park give a consistent sky background reading of 21.90 away from the Milky Way.

Sky Imagery



Natural skyglow over the Warrumbungle National Park taken from the Park's eastern boundary, 26 Jan 2014. (David Malin, 30sec f/2.8 ISO6400)

Bright meteor over the Warrumbungle National Park, 18 Nov 2015 (Ángel R. López-Sánchez).

Unlit Park Buildings

NSW Dept. of Education Warrumbungle Environmental Education Centre, below

Warrumbungle National Park Visitors Centre and Offices last image (temporary offices following the Wambelong bushfire of 13 Jan 2013, with no external lighting. Day use only.)

WARRUMBUNGLE NATIONAL PARK LIGHTSCAPE MANAGEMENT PLAN

Warrumbungle National Park

Visitors to the Warrumbungle National Park are participating in an evolution of tourism in the area, making the park one of the most important contributors to the local economy along with the adjacent Siding Spring Observatory. The Warrumbungle National Park's recognition by the International Dark Sky Association as a Dark Sky Park (DSP) will highlight this prime example of pristine dark skies.

Siding Spring Observatory is Australia's national optical astronomy facility, and the existing Orana Regional Environmental Plan (REP), relevant local environmental plans (LEP) and Warrumbungle Shire Council Development Control Plan No. 1- Lighting Code to Protect Siding Spring Observatory (DCP), has established thresholds for light emissions to protect the observatory's pristine night sky. Except for one small unlit outlying area, the Warrumbungle National Park is wholly within an 18-km radius of the observatory, where the most stringent restrictions apply. Thus, all permanent lighting in the park must already be in accordance with the constraints imposed by the REP, LEP and DCP.

The Warrumbungle National Park Lightscape plan operates consistent with the REP, LED and DCP.

The Aims of this Lighting Management Plan

This plan aims to preserve the pristine dark skies of the Warrumbungle National Park by ensuring that all new lighting is good lighting, and by certifying existing lighting to International Dark Sky standards. There are, in fact, very few lights within the Warrumbungle National Park.

The plan also aims to inform visitors to the park about the benefits of preserving dark skies, and providing them with an excellent experience on living within good lighting standards.

This plan works alongside and in conjunction with the aims of Orana Regional Environmental Plan No.1, relevant LEPs and DCP.

The Warrumbungle National Park and surrounding shire councils must observe these regulations and thus show their commitment to the maintenance of the Dark Sky Park.

Name

This plan is called Warrumbungle National Park Lightscape Management Plan.

Where this plan applies

This plan covers the entire Warrumbungle National Park's area of 23,312 hectares, located between the towns of Coonabarabran, Gilgandra and Coonamble.

Why a Dark Sky Park?

Light pollution has a detrimental effect on professional and amateur astronomy, nocturnal animals and everyone's enjoyment of the night sky. Waste light is also wasted energy.

The Warrumbungle National Park straddles three surrounding shire councils, (Warrumbungle, Coonamble and Gilgandra), which are equally committed to protecting pristine dark skies. The shires and the park value highly the opportunity to become the nation's first Dark Sky Park, to educate and exemplify the benefits of dark skies.

Good lighting

The key to protecting dark sky conditions is not *no* lighting, but *good* lighting. Good lighting does its job well, without causing a nuisance to others. It directs the right amount of light in the right place, does not shine upwards, does not annoy neighbours and does not cause glare. It is safe, and saves energy, reducing its greenhouse footprint. Good lighting benefits everyone.

Types of Lighting in the Warrumbungle National Park

Australian Standards

Compliance is necessary with the current requirements of Australian/NZ Standard AS 4282 (Control of the obtrusive effects of outdoor lighting) and AS/NZS 1158 (Road lighting series).

Street lighting and park and gardens lighting

There will be no street lighting within the DSP

Shops, commercial and industrial buildings

There will be will be a visitor centre which will include external DSP compliant lighting with retail space. This will replace the visitor centre destroyed in the Wambelong fire of 2013.

Advertising signs

There will be a visitor centre and other infrastructure within the DSP; however there will be no advertising lighting within the DSP. There will be electronic signage boards within the DSP and at the 18km zone to assist with management in the WNP in the case of emergency.

Safety and working area lighting

Security lighting in the DSP needs to be properly shielded, well-aimed and of low intensity, to avoid glare and harsh shadows that can hide people and make visibility more difficult. Security lighting of unattended areas must use a motion detector sensor switch. Fittings must be shielded so that no light shines above the horizontal.

Management of lights

Warrumbungle National Park is committed to keeping skies dark by:

- Ensuring that lighting complies with relevant REP, LEP, and DCPs
- Ensuring that all lighting, regardless of its output in lumens, is shielded or properly screened to prevent uplight
- Ensuring that all lights have a coordinated colour temperature less than 3500K
- Providing outreach material to educate visitors regarding the types of lighting they can use in the National Park when camping
- Preventing lights reflecting from white or other surfaces
- Using the minimum number and size of lights, with new lighting to be installed only when a specific public safety concern demands additional lighting
- Switching lights off when they are not needed
- Installing time switches or, preferably, motion detector switches
- All fittings must have an opaque top and/or shielding to prevent any light being emitted above the horizontal plane.
- Down-lights must be deeply recessed with effective low-glare baffles.
- Any structural part of the luminaire or the surrounding material providing the cut off must be securely and permanently fixed. Where the luminaire is bracket mounted from a white or similar highly reflective surface, the light-emitting surface of the luminaire facing the wall must be rendered opaque.
- If intended as a security light during periods of non-attendance etc., the luminaire must be fitted with a motion sensor switch to prevent continuous use. The luminaire must switch off no more than 5 minutes after activation.
- In order to prevent light escaping through glass doors, windows and skylights into the night sky, the installation of heavy-duty blinds, curtains or shutters is required, particularly if operational requirements demand high-powered interior lighting.

Restricted and Prohibited Lighting

- Searchlights and similar high intensity lights are prohibited except when needed for WNP operational activities such as spotlighting for pest control and survey or in emergencies by police or fire personnel.

- The operation of lasers is prohibited except for educational purposes in astronomy.

- Floodlights as used for sports lighting and showground activities are also prohibited, although application can be made for special temporary installations associated with major community events (see below).

- The use of exposed linear lamps primarily intended as an architectural feature or for advertising, is also prohibited. These include fluorescent, cold cathode (neon lighting and signage) and light emitting diodes (LEDs).

- Advertising sign lighting and sports lighting of any type are also prohibited. Electronic sign boards in the park and within the 18km zone are only to be used to assist with management of WNP in emergency.

Short term exemptions for temporary lighting

Temporary lighting is lighting operated for 2 days or less in one calendar year, whether or not the 2 days are consecutive.

Anyone may make a written request to the Warrumbungle Dark Sky Committee for a short-term exemption from the requirements of this plan for temporary outdoor lighting. The request for the exemption must contain, as a minimum, the following information -

- Specific exemption requested
- Reason for the requested exemption
- Time period for use of proposed temporary lighting
- Proposed location of outdoor lighting
- Type and use of outdoor fixtures and lights proposed
- Details of screening and aiming of lights
- Total wattage, light output and type of lamps.

In addition to this information, the Warrumbungle Dark Sky Committee may ask for any other information it needs to consider the request. This committee will usually accept or reject the request in writing within twenty-one days of receiving it. Reasons for rejection may include special astronomical observations taking place at the time.

Permanent short-term exemptions

Two short tem exemptions have been agreed upon within this lighting management plan:

1. A temporary lighting exclusion for the use of spotlighting equipment stands in place for flora or fauna surveys and fox control carried out by NPWS staff or contractors.

2. The Crooked Mountain Concert, a single community event, taking place within the first two weeks of November and within the park area, will make all attempts to keep lighting to minimum. Where possible, the concert will be scheduled near bright of moon, further reducing the need for artificial lighting.

Compliance Requirements

The guiding principle of lighting within the Warrumbungle National Park is that light is used only when and where it is needed, and is appropriate for the specific task for which it is intended. In addition, lighting fixtures (luminaires) are required to be fully shielded, with control by timers or motion-sensors wherever possible. These requirements are already embodied in the provisions of the Orana Regional Environmental Plan No. 1 for land within 18 km of Siding Spring Observatory.

General details of suitable lamps are shown in the annexe below. Under certain circumstances requiring express approval, lamps with less than 500 lumens output may be used unshielded if they are controlled by timers or motion sensors.

Future Lighting Plans and Supporting Information.

A lighting plan must be submitted with any Development Application for within the Dark Sky Park. This plan should include the:

- location and mounting height of all proposed and existing luminaires;
- type of light source with power (watts), light output (lumens) and colour temperature;
- details of all shielding necessary to meet the requirements of this document, including those incorporated in the luminaire construction.

Replacing Light Fittings

If any existing, non-complying external light fitting is replaced, it must be replaced with a complying fitting. If an existing, non-complying external light fitting can be made to comply by replacing the lamp (light source) with a different type, then this must be done when the lamp fails.

Within 12 months of achieving Dark Sky Park designation, 90% of lights will comply with IDA regulations.

Lamp Light Output Annexe

Suitable lighting can be chosen from these complying lamp types:

Light Output	LEDs	CFLs	Incandescents
Lumens	Watts	Watts	Watts
450	4 - 5	8 - 12	40
750 - 900	6 - 8	13 - 18	60

All lamps are required to have a coordinated colour temperature (CCT) of less than 3500K (warm white), with a preference for CCT below 2500K.

Reporting

The Park will submit an annual report to IDA by 1 October of each year detailing activities and progress towards fulfilling IDA DSP goals during the previous year.

Warrumbungle National Park Light Inventory

Location	Fixture	Fully, Shielded	<500 lumens	Application	Conformity with LMP
Toilet Block 1	Covered light	Yes – with motion sensor	Yes	Egress	Yes
Toilet Block 2	Covered light	Yes – with motion sensor	Yes	Egress	Yes
Cooking Area 1	Warm, downward pointing lights with sensor	Yes, and with time sensor	Yes	Meal preparation	Yes
Telephone Box	18w fluorescent bulb, with transparent roof	No. Built to Telstra guideline G630: 2006 (attached) See Rectification Process below	Yes	Security, phone box	Now conforms
Amenities Block	Six recessed down-lights	Lights comply, but light currently leaking through skylight. See Rectification Process below	Yes	Amenities	No – see below

Rectification Process and timeframe:

Location	Fixture	Why doesnt it comply now?	Rectification to conform with LMP	Time Frame for completion
Lights illuminating septic waste dump to left of Camp Blackman Toilet Block 2	Two post-mounted LED fixtures	1. High upward light spill 2. CCT >3500k	Remove lights: no need to replace.	Completed by October 2015
Camp Blackman Telstra phone Box internal lighting	18w fluorescent bulb, with transparent roof	1.Light leaking through ceiling 2. CCT >3500k	1. Warm yellow anti-insect globe to be fitted by Telstra contractors. 2. Roof of phone box to be painted with Engine Enamel to create shielded roof.	Completed by 22 November, 2015 (see photos below)
Camp Blackman Amenities Block internal lighting	Six recessed downlights	1.Lights comply, but light currently leaking through sky light.	Inclusion of motion sensors on amenity lights.	To be completed by 30 June, 2016 (see photos below)

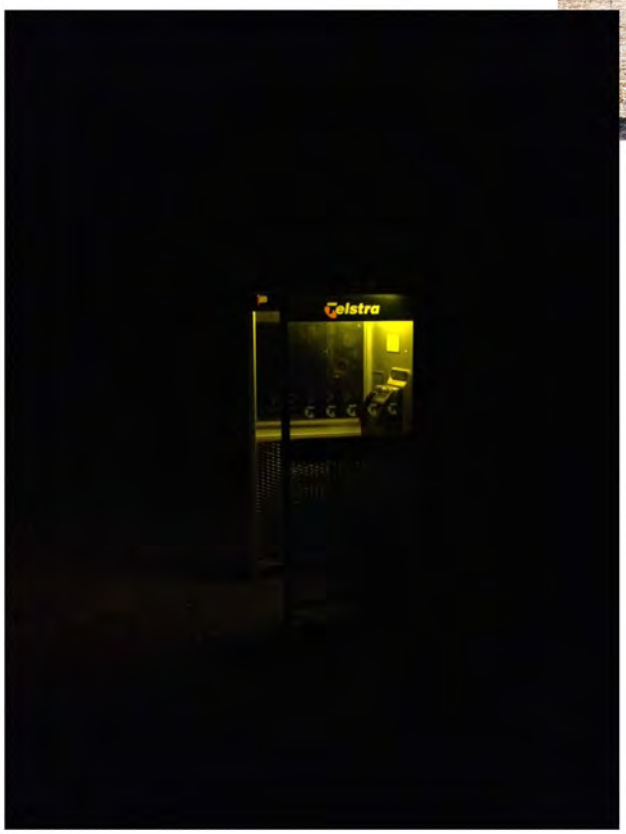
Lighting Photo Inventory

Camp Blackman Phone Box

RECTIFICATION: Current 18w fluorescent light replaced by yellow Anti-insect globe. Roof painted with heat proof engine paint.

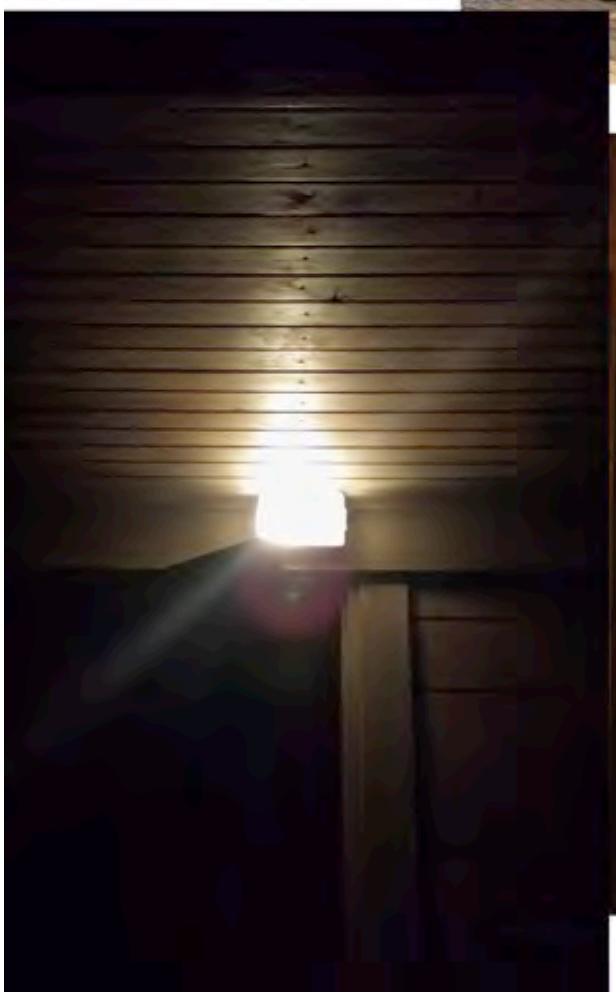
Before rectification:

After rectification:



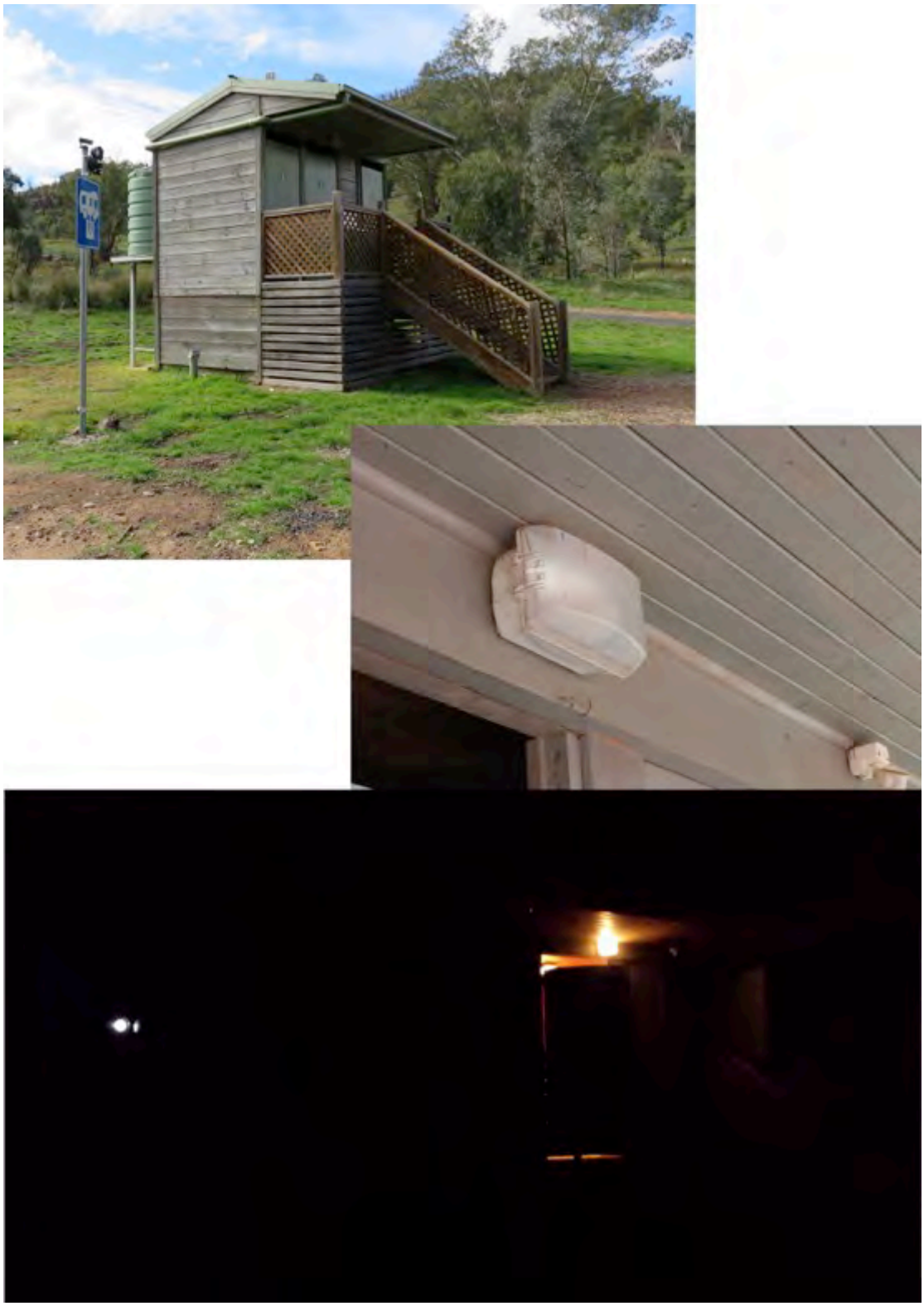
Camp Blackman Toilet Block 1

(Compliant)



Camp Blackman Toilet Block 2

(Compliant: light fitting on left now removed)



Camp Blackman cooking area lights

(Compliant)

Amenity Block

RECTIFICATION : Fitting of time monitors on lights (by mid-2016)

Public interpretation of Dark Sky Restoration projects

The 'night sky friendly' lighting projects described in pages 35-42 are the subject of public information notices in the National Park Visitor Centre. At present, the relevant sections of the Photo Inventory are reproduced alongside the following explanatory text:

'As part of its bid to become Australia's first Internationally-recognised Dark Sky Park, the Warrumbungle National Park is undertaking a program of improvements to the lighting of facilities within the Park. Fittings that allow light to leak upwards into the night sky are being removed, or replaced with fittings that are either fully shielded or have motion-sensor switches to turn them on only as required, and for a limited time-period. Also, white lamps are being replaced with warm-white or peach-coloured lamps, which are less damaging to the night sky.

'Examples of this work are shown here:
1. Northern Camp Blackman Toilet Block: Light fixtures illuminating waste dump now removed.
2. Telstra Phone Box, Camp Blackman Amenities Block: Warm-white lamp has been fitted; ceiling has been painted to prevent upward light-spill.
3. Camp Blackman Amenities Block internal lighting: Upward light-spill through ceiling skylights will be mitigated by fitting time-switches linked to the operation of individual facility doors.'

Sky quality Monitoring Program with Macquarie University

On an annual basis, the Warrumbungle Dark Sky Park Committee, members of the local Astronomical Society and students from the Earth and Planetary Sciences of Macquarie University commit to a Citizen Science program to monitor the sky quality of the Warrumbungle Dark Sky Park. This will take place prior to September each year

The citizen science program will:

- Commit two (consecutive) nights each year
- Take light sky measurements in a minimum of 12 sites utilising a Unihedron Sky Quality Meter supplied by the Australian Astronomical Observatory.
- Back up light readings with dark sky photography
- Confirm the lighting inventory within the Warrumbungle National Park
- Analyse information including various measurements including the Bortle Scale, LUX, lumens

This light control community project will see volunteers chosen by Dr Craig O'Neill, (Macquarie University Department of Earth and Planetary Sciences) and will be given a lecture and tour of the Australian Astronomical Observatory by Prof Fred Watson.

Further assistance will be given by Dr Richard McDermid of the Department of Physics and Astronomy, Macquarie University.

The University of Wollongong (Physics Department) has also expressed an interest in participating in this program.

WARRUMBUNGLE NATIONAL PARK AND SIDING SPRING OBSERVATORY – PHASE II

In proposing this venture, the Warrumbungle Dark Sky Committee has the support of the NSW National Parks and Wildlife Service as the site manager, Siding Spring Observatory, the Warrumbungle, Gilgandra and Coonamble Shire Councils, and *Australian Geographic* Magazine.

Both the Observatory and the National Parks and Wildlife Service firmly believe the proposal would be enhanced if the Dark Sky Park were to incorporate both the existing 23,312 hectares of the Warrumbungle National Park and the facilities and grounds the adjoining Siding Spring Observatory. In doing this, the contribution from both parties would ensure optimum dark sky park outcome involves with an ongoing partnership between the NPWS and Siding Spring Observatory.

The understanding between the NPWS and Siding Spring Observatory is that NPWS will:

- Create and distribute flyers to educate campers about keeping their lights low;
- Display outreach materials in the Visitors' Centre and near amenity blocks;
- Educate visitors of the benefits of keeping lights low;
- Incorporate dark sky branding and education into existing outreach opportunities, such as:
  - Crooked Mountain Concert (during or close to bright of moon)
  - Starry Night Programs branding to DSP programs
- Comply with existing State Environmental Planning Policy, REP, LEP and DCPs.
- And, where necessary, retrofitting of lighting shielding;

Siding Spring Observatory will:

- Provide and create outreach materials
- Deliver major outreach programs
- Create a Lightscape Management Plan, and
- Make ongoing lighting measurements.

With the purpose of getting the Dark Sky Park designated at the earliest possible date, the existing National Park boundary line will be considered as Phase I. Committing to Phase II of the Dark Sky Park (a proposed expansion of the area to included Siding Spring Observatory) has the support of the principal entities governing the site, being the Australian National University (ANU) and the Australian Astronomical Observatory (AAO) – see following letters. In so doing, the SSO Dark Sky Committee will create the lighting inventory, take lighting measurements, implement the lightscape management plan specified in this document and lodge a document submission to the IDA within 12 months of Phase I of the Dark Sky Park.

Letter of support from National Parks and Wildlife Service

Office of Environment & Heritage
NSW National Parks & Wildlife Service

DOC15/454171

Professor Fred Watson AM
Head of Lighting and Environment
Australian Astronomical Observatory
PO Box 915
NORTH RYDE NSW 1670

fgw@aao.gov.au

Dear Professor Watson

Support for the proposed Warrumbungle Dark Sky Park

I am pleased to advise as the manager of the Warrumbungle National Park, that the NSW National Parks and Wildlife Service (NPWS) supports the nomination of the park as part of the proposed Warrumbungle Dark Sky Park.

As discussed our support for the proposal is on the basis that the Australian National University and Australian Astronomical Observatory agree to have the Siding Spring Observatory site included in the Dark Sky Park as part of the stage two nomination within 12 months of any International Dark Sky Association acceptance of the stage one nomination.

If you need any further information you can contact Mr Mark Peacock, Director Western, NPWS on 0447 659 544 or mark.peacock@environment.nsw.gov.au.

Yours sincerely

MICHAEL WRIGHT
Deputy Chief Executive
National Parks and Wildlife Service

PO Box A290 Sydney South NSW 2000
Level 15, 59-61 Goulburn Street Sydney NSW 2000
Tel: (02) 9995 5000 Fax: (02) 9995 5399
ABN 30 841 387 271
www.nationalparks.nsw.gov.au

Letters of support

Australian Government
Department of Industry

AUSTRALIAN ASTRONOMICAL OBSERVATORY
PO Box 915, North Ryde, NSW 1670, Australia
Telephone: +61 2 9372 4811
Facsimile: +61 2 9372 4880

Email:
director@aao.gov.au

Prof Warrick Couch FAA, Director

12 November 2015

Professor Fred Watson AM
Chair, Siding Spring Dark Skies Committee
Siding Spring NSW 2357

Dear Fred,

In its capacity as the national optical astronomy observatory, the Australian Astronomical Observatory (AAO) operates two telescopes at the Siding Spring Observatory: the Anglo-Australian Telescope and the UK Schmidt Telescope. Our operation relies heavily on dark night skies to conduct our world leading research.

The proposal to make the Warrumbungles National Park a Dark Sky Park recognised by the International Dark-Skies Association (IDA) is clearly an invaluable step towards retaining the great advantage offered by the Siding Spring Observatory through its facilities as well as its dark skies. I understand that this will be the first such park in Australia.

I commend the work that the Siding Spring Dark Skies Committee has been doing in association with the local councils, the ANU, other SSO tenants and the NSW state government. I strongly support *The Dark Sky Park* initiative.

Additionally, the AAO will provide every assistance in extending the area of the Dark Sky Park beyond the Warrumbungle National Park boundary to include Siding Spring Observatory itself. We regard this as a natural and highly-desirable second phase of the Dark Sky Park proposal, and undertake to assist in submitting an application in collaboration with the NSW National Parks and Wildlife Service (NPWS) within 12 months of the original submission. Furthermore, we undertake to provide interim support to the NPWS in creating and providing outreach materials, delivering outreach programs, and making ongoing lighting measurements.

Yours sincerely,

Warrick Couch

Professor Matthew Colless FAA FRAS
Director
Research School of Astronomy and Astrophysics
The Australian National University

Mount Stromlo Observatory
Weston Creek, ACT 2611, Australia

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www.rsaa.anu.edu.au

19 November 2015

Prof. Fred Watson
Chair, Siding Spring Dark Skies Committee
Australian Astronomical Observatory
PO Box 915, North Ryde, NSW 1670

Dear Fred,

The Australian National University owns and operates Siding Spring Observatory, and supports both its own telescopes on the site as well as a wide range of other telescopes (including national facilities such as the Anglo-Australian Telescope), research facilities operated by other institutions from Australia and overseas, and some commercial and outreach faciilties. We are proud that Siding Spring is the biggest and best site for optical and infrared astronomy in Australia, and we are very keen to support measures that will help it remain so.

The proposal to make the Warrumbungles National Park a Dark Sky Park recognised by the International Dark-Skies Association (IDA) is clearly an valuable step towards retaining the great advantage conferred on Siding Spring Observatory by its outstandingly dark skies. The Dark Sky Park can be seen as part of a much wider, long-term strategy that the Siding Spring Dark Skies Committee has been implementing in association with the local councils and the NSW state government.

In future the ANU is willing to consider the inclusion of Siding Spring Observatory in the Dark Sky Park as a second phase of the Dark Sky Park proposal. While working towards this goal, we undertake to provide support to the NPWS through the Siding Spring Dark Sky Committee in creating and providing outreach materials, delivering outreach programs, and making ongoing lighting measurements.

As Director of the Research School of Astronomy and Astrophysics at the Australian National University, I strongly support this important and valuable initiative.

Yours sincerely,

Matthew Colless

Professor Matthew Colless
Director, Research School of Astronomy and Astrophysics
The Australian National University

Coonabarabran:

20-22 John Street
Coonabarabran NSW 2357

PO Box 191
Coonabarabran NSW 2357

ABN: 63 348 671 239

warrumbungle
SHIRE COUNCIL

Calls from within Shire:
1300 795 099
Calls from outside Shire area:
Coonabarabran:
02 6849 2000
Coolah: 02 6378 5000
Fax: 02 6842 1337
Email:
info@warrumbungle.nsw.gov.au

Coonabarabran - Coolah - Dunedoo - Baradine - Binnaway - Mendooran

Please address all mail to:
The General Manager

Please refer enquiries to:
Aileen Bell

16 June 2015

Re: SUPPORT FOR A DARK SKY PARK IN AUSTRALIA

Warrumbungle Shire Council applauds the initiative of the DSP Committee to pursue the designation of a Dark Sky Park in Australia, and more particularly in the Warrumbungle Shire.

Over the years Warrumbungle Shire Council (and previously Coonabarabran Shire Council) has been instrumental in establishing parameters for development that protect the local night sky and the ventures and research of Siding Spring Observatory at Mt Woorut in the Warrumbungle Range some 28kms from Coonabarabran (the administrative centre for the Shire). There is no question that the policies established at a local and regional level have raised an awareness of the importance of the night sky to our area. While we support and enthuse about the benefits to astronomy research we also need to remember that a dark night sky is important to the environment in which we live; the circadian rhythms of humans and wildlife, the vegetation needs and tidal impacts are all important considerations when looking at the benefits of dark night skies.

Coonabarabran has adopted the un-challenged title of Astronomy Capital of Australia and Astro-Tourism is certainly an important aspect within the shire. No-where else in Australia can the travelling public have such a total immersion in astronomy. By day they are able to visit the largest optical astronomy research facility in Australia and Australia's largest telescope and then by night they can "become astronomers" themselves and avail themselves of any of three private astronomy facilities set up for public use for night sky viewing. Many visitors to the town and shire extend their stay because of the astronomy opportunities, this in turn increases the economic value of tourism to the community. Our proximity to the Australia Telescope and Compact Array at Narrabri and The Dish at Parkes ensure people get the total astronomy story; however, it is only in Coonabarabran that the total experience can be had. Residents have embraced the astronomy theme and local business houses have adopted parts of the Universe; galaxies, planets etc; but nowhere else in Australia can you take a drive to find a plethora of telescopes in residents' own backyards, a reflection of commitment and interest.

The proposed concept has the potential to raise the profile of our community as one which values and cares for the night sky to the international "Dark Skies community". The location of Siding Spring Observatory, and its proximity to the Warrumbungle National Park which boasts boundaries with Gilgandra and Coonamble Shires along with the already established development policies and regulations that protect the night sky and the commitment of residents make Warrumbungle Shire an ideal location to become Australia's first Dark Sky Park.

What we have not touched on here is the connection the Aboriginal people have with the night sky and stories told make it very clear that the significance of the night sky was not lost

on Aboriginal people who used the formations in the sky to guide them through their hunting and livelihoods; Coonabarabran has a significant Aboriginal population and is part of the tribal lands of the Gamilaroi people (or the Gomeroi). Warrumbungle Shire Council liaises closely with the Aboriginal community through advisory networks and while not speaking on behalf of the people, works closely to ensure their interests are acknowledged and met.

As a Council we see great value in such a designation within our shire. It is a reaffirmation of our commitment to the dark skies; it profiles our whole shire (which has two other equally but different national parks and the endemic wildlife Australia is so well known for); it would also strengthen our position as a tourism destination in the world of science and research.

Should you require further assistance Aileen Bell, Council's Manager Economic Development and Tourism is available to contribute in any way and can be contacted on 02 6849 2140.

Yours faithfully,

STEVE LOANE
GENERAL MANAGER

Mark Coulton MP
Federal Member for Parkes

jg/mc

14th September 2015

To Whom It May Concern

As the Federal Member for Parkes, I have great pleasure in supporting the Siding Spring Observatory Dark Sky Committee's proposal that the Warrumbungle National Park be recognised as Australia's first international Dark Sky Park.

The Warrumbungle National Park is located near Coonabarabran in the Parkes Electorate, New South Wales. The Park is an iconic feature in NSW and is surrounded by wide open plains. Not only is the Park a tourist drawcard, it also attracts many people from the astronomy community due to the world-class optical astronomy research facility, Siding Spring Observatory.

Overlooking the Warrumbungle mountain range, the famous Siding Spring Observatory is the ideal place to view the infinite night sky. This area has some of the clearest night skies in Australia. Along with its high altitude, low humidity and clean air, there are not many other places in the world that match in terms of ideal conditions for stargazing.

The community of Coonabarabran also has a proud astronomy history and is known as the 'Astronomy capital of Australia'.

The preservation of the night's sky from artificial light pollution is important, and it is for this reason I am supportive of the proposal to declare the Warrumbungle National Park a Dark Sky Park. This declaration will ensure the superior views at the Warrumbungle National Park are available for future generations to enjoy.

I offer my strong support for the Siding Spring Observatory Dark Sky Committee's application, and trust that it will be considered favourably

Yours Sincerely,

Mark Coulton MP
Federal Member for Parkes

THE NATIONALS for Regional Australia

mark.coulton.mp@aph.gov.au www.markcoulton.com.au

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Moree Electorate Office
69 Heber Street, Moree NSW 2400
ph 02 6751 1251 fax 02 6751 1253

LIGHTING ANALYSIS & DESIGN **Reg. R. Wilson FIES (Aust./ NZ)**

Independent Lighting Consultants **MIES (Nth. America)**

ABN 32 434 763 494 **Assoc. IALD**

32 Carina Road, Turramurra, N.S.W. 2074
Ph. & Fax (02) 9488 7078, Mobile 0413 272 878
E-Mail regrw@tpg.com.au
Web Page users.tpg.com.au/regrw

The Organiser

Warrumbungle Dark Sky Park

I would like to make a brief but sincere note of support for the proposed Warrumbungle Dark Sky Park. As an IDA Lifetime Member (20years membership) now a retired Asia Pacific Liaison Officer I offer continuing assistance to this great development .

My experience in lighting (especially for outdoors) enables me to work as a Committee Member of two Standards Australia Standards (AS/NZS 1158 - Lighting for Roads and Public Spaces and AS4282 – Control of the Obtrusive Effects of Outdoor Lighting. enables me to assist in the preparation of Warrumbungle Dark Sky Park proposal.

I have discussed this proposal with a number of colleagues in both Standards Australia and the Illuminating Engineering Society (IES) and all were impressed with the possibilities it offered.

The need for this move has been discussed a number of times over the past few years but the but the lack of active support due to a lack of available organisation precluded a start.. This was overcome due to active work by Prof. Fred Watson and his assistants. This move was enthusiastically supported by local bodies such as Warrumbungle Shire Council and the National Park Services..

I offer my continued support through my business, Lighting Analysis & Design, to the preparation of the Application for the approval of this wonderful community showpiece.

Reg. R. Wilson FIES

warrumbungle
SHIRE COUNCIL

Office of the Mayor
Cr Peter Shinton

International Dark Sky Committee

I am writing on behalf of the citizens of Coonabarabran and the Warrumbungle Shire Council in support of the nomination for a Dark Sky Park in the Warrumbungle National Park near Siding Spring Observatory in Coonabarabran.

For many years the people of Coonabarabran as the closest town have respected the wishes of the Observatories to keep our lighting focused downwards and indeed the former Coonabarabran Shire Council introduced the Orana Regional Environmental Plan No.1 – Siding Spring in 1990.

On a visit to Japan to the Bisei Astronomical Observatory I took the opportunity to speak on local television about Warrumbungle Shire Councils policy to keep our skies dark and I know the astronomers were trying to promote local efforts to reduce light pollution around their facility.

In 2007 when comet McNaught appeared over Coonabarabran, Jon Dee, the founder of Planet Ark was with my wife Julie and I at our home east of Coonabarabran. He was so taken by the view of the comet that he began to phone friends in Sydney to go outside to see it. He was so disappointed when they told him they could see nothing or perhaps just a shadow.

Coonabarabran wears the title of the Astronomy Capital of Australia and a large portion of tourist dollars flowing into our area is because of Siding Spring. We are a community that cares about our dark skies and in my opinion the recognition of a Dark Sky Park is a just reward for our small scarifies of focusing lights down or just shielding light spill because we are all interested in assuring that astronomical research and scientific endeavor continues on our mountain.

Peter Shinton
Mayor
Warrumbungle Shire Council
25th June 2015

All Correspondence:
14 - 22 John Street
Telephone: 02 6849 2000

GilgandraShireCouncil
meeting community needs

PO Box 23
Gilgandra NSW 2827

Tel: (02) 6817 8800
Fax: (02)6847 2521

Email: council@gilgandra.nsw.gov.au
Visit: www.gilgandra.nsw.gov.au

PM:MS

File: EM.PL.1
Contact: Lindsay Mathieson

25 June 2015

TO WHOM IT MAY CONCERN

"DARK SKY PARK", WARRUMBUNGLE NATIONAL PARK

Gilgandra Shire Council wishes to commit its support "in principle" for the establishment of a "Dark Sky Park" within the Warrumbungle National Park at Coonabarabran.

Gilgandra is fortunate to have the precious asset of the Warrumbungle National Park within our Shire and Council is supportive of the establishment of any infrastructure to enhance the Park and, in turn, promote eco and astro-tourism for the area.

Considering that much of the infrastructure required to establish the "Dark Sky Park" is already in place with the existing Siding Springs Observatory, it appears that this is an ideal opportunity to further enhance the Warrumbungle National Park's facilities with a minimum financial input.

Yours faithfully

P A Mann
General Manager

COONABARABRAN GOLF CLUB CO-OP LTD

PO Box 176
Coonabarabran NSW 2357

Telephone: 6842 1292
Fax: 6842 3023

ABN 81 337 466 142

President: Frank Clifton
Secretary: Zoe Holcombe

In Support of Dark Skies Park in Warrumbungle National Park

The Coonabarabran Golf Club would like to give its support for the Warrumbungle National Park to be recognised as a Dark Skies Park.
The Warrumbungle Shire already has strict lighting regulations in place to help keep our skies dark due to the Siding Spring Observatory and with the National Park being right next door this is an ideal area for a DSP.
Having the National Park recognised by a DSP will give the Shire an increase in tourism which will benefit the town of Coonabarabran immensely.

Thank you

Zoe Holcombe
Secretary & Licensee Coonabarabran Golf Club

22/06/2015

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Cameron Wylie 23/06/2015

Astronomer in Charge/ Science Communicator : Milroy Observatory.

Prop: Astronomy DownUnder.com

I'm grateful to be able to add weight to a submission for a 'Dark Sky Park' in the Warrumbungle region for reasons that it is *much much* more than a Nice thing.

ENVIRONMENT

In terms of Environmental benefit the establishment of a DSP begins a process awakening to a population at large that, dark skies are not only nice for stargazing but oh so important environmentally as the Human race notices the impact of its own wastefulness on that environment.

Directly, Light pollution makes anything that relies on night awkward. By this I also refer to nocturnal species that find another reason to move house, but with light pollution everywhere, where to next? Also they often cannot hunt without dark as they rely on its 'stealth effect'. In a National park brimming with unique species, if we are to be becoming more responsible, offering good husbandry of these ecosystems, then a Dark Sky Park is fundamental to the strength of that conviction.

ASTRONOMY

We all have a right to look up at night in wonderment of the twinkling lights in the sky as our parents showed us, perched on their shoulder, as we had our first tour of the constellations given to us. Isn't it our Children's right to have '*NIGHT SKY'* to see?

As a Fundamental part of the human journey the sky is so important. Our ancestry is in the heavens it's where our atoms got made and where the Cosmic Environment meets our

atmosphere that flows through our lungs... We are 'Of' the sky not divorced from it and to deprive anyone of a clear view of 'home' is abhorrent.

Astronomers in this park, at Siding Spring, at Milroy Observatory, Warrumbungle Observatory, in town and all the Hobbyists, have invested what amounts to Billions of dollars over the years in this area having chosen it as a safe haven devoid of stray 'False light' entering their cameras, their sensors, their Scientific data, their livelihood and importantly our future ability to understand and Know the universe. If anyone needs to appreciate how valid that is just think of the computer you're reading this on and phone/computer in your pocket. All of these are products of this Understanding.

Light Trespass attacks not just next doors bedroom window, but fills up our sky and one by one the stars go out.
In Japan they see TWO stars...

WORLD HERITAGE

In terms of World Heritage, surely our sky has even more importance than a lovely old stone building. As much as our kids can enjoy these old buildings and sites we take great pride in protecting, how deserving of World Heritage listing and protection are our skies?

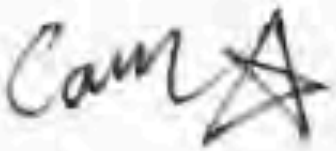
Common sense dictates that the Night Sky '*must*' come under this.

OUR RESPONSIBILITY

So much more than just a good thing to have for the above reasons, we, as aware members of our species, have a responsibility to herald projects like this one, to create, to uphold them more and more, as issues like the atrophy of our planets environment are increasingly ignored by those who would otherwise profit from such ignorance.
To champion such a cause is therefore, an insurance policy for our corner and an investment in everyone's future.

The fact that we are slowly becoming aware out in the media is good but as we lose ground we can all claw back some if we get behind projects like this one, it's good for me, it's good for our Kids and it's good for our Planet.

Keep the lighting Controlled, stop wasting energy with 'inefficient over lighting' and non-directional lighting, all make good sense as if it comes to dollars, It's simply 'cheaper' to only shine light where you need it. This and the energy saving effect 'will one day' be regulation, as our resources become more taxed and begin to dry up, legislature of common sense will be more common.
It's only a matter of time. Why not Today?



Sincerely, Cam Wylie: Astronomer

dmi
david malin images
111 Cabbage Tree Road, Bayview, NSW 2104, Australia
Ph: +61 2 9997 1914
e-mail: david@davidmalin.com

In support of a Dark Sky Park in New South Wales

The sky at night has been an inspiration to our species since we developed the sense of wonder. It fills half of our field of view and is there to be enjoyed for half of our time on this planet. This division of hemispheres defines heaven and earth, and all cultures around the world embrace this idea and label the pattern of the stars with their own individual legends and beliefs. Sadly, we are loosing touch with this subtle but inspiring natural spectacle, a process that began about 130 years ago with electric street lighting. As a species we are poorer because of it.

My interest in the night sky stems from a long career as a photographer and astronomer with the Australian Astronomical Observatory, located near Coonabarabran in the thinly-populated central west of New South Wales, Australia. When I joined the Observatory in 1975 there were very few artificial lights to be seen at night across the vast plains surrounding the Observatory. This is now no longer true, despite an overall drop in population in the region. In part, this due to the very obvious brightening of lighting in the regional cities within 200 km of the Observatory, including the light dome from the Sydney-Newcastle region, far below the horizon, 350 km distant. Increasingly, it also the result of extensive mining activities much closer to the Observatory.

Almost all of this light shining into the sky represents an utterly pointless waste of energy, which is itself derived from the very coal that is being mined around Siding Spring.

While all this may seen a parochial issue, mainly promoted by astronomers, it is clear that there is a world-wide push to preserve the night sky for future generations in places where there are no observatories.

Once the darkness is lost it will be difficult to recover, and this is now increasingly an issue in the heavily populated and seriously light-polluted northern hemisphere. While Dark Sky Parks are increasingly common in the USA and Europe, they can only hope to prevent further degradation of what darkness remains.

In Australia we have the opportunity to preserve a sky that, though threatened, is still the envy of the world. But we have to act now, before an important part of the natural world is lost for ever.

Sincerely

David Malin, 2015 June 5.

Coonabarabran
District Chamber of Commerce
Incorporated

ABN: 16 240 642 381

P.O. Box 341, Coonabarabran NSW 2357

Victor Schmidt	Eunice Dicks	Peter Brocklehurst	Eva Brocklehurst
President	Vice President	Secretary	Treasurer
6842 1500	68422550	6843 4491	6843 4491

June 26 2015

To whom it may concern.

Re: SUPPORT FOR A DARK SKY PARK IN AUSTRALIA

The Coonabarabran & District Chamber of Commerce commends the intention to seek a Dark Sky Park in the Warrumbungle National Park.

Dark skies are a concept which is not unfamiliar to the community and businesses, which have been proud to have the Sidings Springs observatory in their midst for several decades. The local building requirements already include some provision for maintaining dark skies and further enhancement of the concept, in tandem with the region's natural tourist attraction - the Warrumbungle National Park - would be very worthwhile.

The chamber recently hosted a dinner with our state MP, Kevin Humphries, who himself stated that growing astronomy as a tourist attraction was of great importance to the region and should be considered as a "package" together with promoting other natural attractions in the area. A Dark Sky Park, we believe, would further this aim.

Yours faithfully

Peter Brocklehurst
Secretary
Coonabarabran & District Chamber of Commerce

Acacia Motor Lodge

10 John St
Coonabarabran NSW 2357

August 31, 2015
Dark Sky Park Submission

The Acacia Motor Lodge fully support the establishment of a Dark Sky Park in the Warrumbungle National Park. We believe our region will benefit economically as it is a sustainable project which will attract many star gazers, both amateur and professional. It will also help the International community in general gain a greater insight and understanding to what is really out there.

Regards Bob and Sheree McGill

Coonabarabran and Upper Castlereagh
Catchment & Landcare Group inc

President Di Bedggood
Secretary Laura Hartley
939 Timor Road
Coonabarabran
NSW 2357

In support of a Dark Sky Park In New South Wales

As the local Landcare group (Coonabarabran & Upper Castlereagh Catchment Landcare group) adjoining the proposed Dark Sky Park, we would like to write in support of the Warrumbungle NP being designated as an International Dark Sky Park. Landcare comprises community groups that are tasked to monitor and protect the natural environment and this group believes that such a Dark Sky Park would contribute vitally, in practical, educational and multi layered ways to this work.

The role of nocturnal lighting in unbalancing the natural environment is often ignored, but some of the most basic facets of plant growth like pollination are intimately intertwined with insect and animal behaviours. Such behaviours can be permanently disrupted by increased night time lighting. The Warrumbungle NP and some of the surrounding area are relatively unaffected by developments that have dramatically changed the environment across much of Australia. Dark skies will act as additional protection for much of the existing flora and fauna from changes that are taking place throughout much of eastern Australia.

Declaration of the Warrumbungle NP as a Dark Sky Park will contribute to a better profile for the National Park system in Australia which is under significant political and economic stress. Also, with the Park adjoining Siding Spring Observatory, there already exists legislation to restrict many aspects of uncontrolled lightin g development. This legislation acts to preserve the dark sky for astronomical research but also attracts amateur astronomers to move to the area to live and work and encourages astronomical tourism. Members of our Landcare group have been or are currently involved in educational programs within the Warrumbungle NP or have given astronomy talks to campers within the park. The camp grounds themselves have stunning scenery forming a wonderful backdrop for wide-field astrophotography. For the general public across Australia, who are increasingly concentrated in cities, a visit to this scenic and dark sky region will provide an experience that is becoming increasingly rare in the modern world; a dark sky filled with stars.

Sincerely

Laura Hartley
Secretary
24 June 2015

ROTARY CLUB OF COONABARABRAN

Po Box 265, Coonabarabran 2357

President: MsAileen Bell
Secretary: Mr Lindsay Wilkin
Treasurer: Mr John Sawyer

Re: IDA Dark Sky Park Proposal for Warrumbungle Region

It is with interest that this Rotary Club notes the suggestion that the area around Siding Spring Observatory and the Warrumbungle National Park be designated as a Dark Sky Reserve/Park.

The area is in a pristine area to the west of Coonabarabran and there is no doubt that the area was selected in the late 1950's early 1960's as the home of Siding Spring Observatory because of the region's capacity to deliver an incredibly dark night sky conducive to effective night sky observing.

The membership of the Rotary Club is made up of Coonabarabran residents and a number of our Club members are also members of the Astronomy Club of Coonabarabran; some settling in Coonabarabran because of the astronomy facilities and opportunities. Previous directors at Siding Spring Observatory have been members and club leaders.

As a Rotary Club we present a specialised program called RYSTARS (Rotary Youth Studying Astronomy and Related Sciences) each year. Siding Spring Observatory staff, and more particularly AAO staff have made themselves available to students and ensured they gain a sound understanding of the work of astronomy. We see this as a way to focus attention on the dark skies over Siding Spring Observatory to a group who may otherwise not have considered the issues of light pollution.

We believe the designation of the area as a Dark Sky Reserve/Park has the potential to highlight the importance and appropriateness of the existing lighting and development codes for Warrumbungle Shire and the Orana Region.

We also believe that it provides a safe nocturnal habitat for the wildlife of the area – noting that this area is one where visitors are able to see Australian wildlife, up close and in their natural environment. There is no question that residents are very protective of the sky and the value of Siding Spring and its observatories to Coonabarabran.

The development of those policies several years ago to protect the night sky over Siding Spring Observatory served to profile other significant benefits of a dark night sky and the protection of our special environment is important to residents and visitors alike.

Currently Coonabarabran boasts three privately owned observatories where visitors can access opportunities to view the night sky and the level of interest in observing the southern night skies by those amateur enthusiasts in the northern hemisphere is not lost within the tourism industry.

The successful bid for a DSP would profile the area to a broader international audience and enhance our eco tourism opportunities as well as create more opportunities for astronomy tourism and related businesses.

We wish you well with your endeavour and add our support to the local voice for a Dark Sky Reserve/Park.

Yours faithfully,

Aileen Bell
President

Coonabarabran Bowling Club

Edwards Street, Coonabarabran NSW 2357
PO Box 288, Coonabarabran NSW 2357
Bar: 02 6842 1349
Fax: 02 6842 2371

Office: 02 6842 1344
Email: co55792@bigpond.net.au

In support of a Dark Sky Park in New South Wales

We would like to give our support for a Dark Sky Park in the Warrumbungle National Park.

With lighting regulations already in place in the Warrumbungle, Gilgandra and Coonamble Shires to protect Siding Spring Observatory, the Warrumbungle National Park is an ideal space to become Australia's first Dark Sky Park

Once the darkness is lost it will be difficult to recover, a Dark Sky Park in the Warrumbungle National Park is a step in the right direction to prevent further degradation of the remaining darkness.

In recent times our bowling club replaced lights on our greens, and although expensive, the Club supported the Shires lighting regulations to help keep the darkness in the area.

Yours sincerely

Bob Tootell
Assistant Manager
Coonabarabran Bowling Club
0459040551
15th June 2015

16 Dick Street
Henley
NSW 2111

September 7, 2015

Professor Fred Watson
Australian Astronomical Observatory
Delhi Road, North Ryde 2113

Dear Professor Watson,

As a member of an astronomical society I am aware of the important research carried out at the Australian Astronomical Observatory at Siding Spring and of the problem that increasing light pollution creates for such facilities.

As a professional biologist I am also concerned about the effects of light pollution on the behavior and survival of nocturnal amimals.

It also concerns me that a significant proportion people world-wide live in places where they can no longer view the Milky Way.

For these reasons I wholly support the initiative to establish Australia's first dark sky park in the Warrumbungle National Park.

Yours sincerely

Dr John Walker

27th August, 2015

Dear International Dark Sky Association,

Re – Letter of Support

The proposal to designate the Warrumbungle National Park as a Dark Sky Park, has recently come to our attention. On behalf of Inland Tourism (NSW) we write now to show our support of this proposal.

Inland NSW Tourism is the regional tourism organisation (RTO) for the region and represents Local Government Areas, tourism associations and individual operators throughout Inland NSW. Our objective is to double overnight visitor expenditure to Inland NSW by 2020 (using 2011 as a base) and pleasingly we are on track to achieve this goal.

Our association covers more than 40% of NSW including the Warrumbungle National Park, and contains a population base of more than 500,000 people providing access to funding and a voice for our many tourism operators and destinations in the region.

The Heritage-listed, Warrumbungle National Park, offers a fabulous attraction for nature lovers, with world-class bushwalks and dedicated campsites, and several hotels and restaurants in nearby towns of Coonabarabran, Coonamble and Gilgandra. This magnificent ancient volcanic landscape hosts the Siding Spring Observatory with various astronomical facilities of interest that constantly engage the curious-hearts and minds of the public through their astronomical discoveries.

Incorporating a Dark Sky Park into the Warrumbungle National park, into an area already governed with strong lighting regulations; high visitor numbers and an acknowledged tourist destination provides the perfect opportunity to increase public understanding of the benefits of dark skies to humans, wildlife, sustainability and heritage.

Inland NSW understands these benefits, and as a consequence warmly supports this initiative in our efforts to encourage more visitors to the area.

Yours faithfully

Graham

Graham Perry
Chief Executive Officer

Supporting Documents

Article By Liz Cutts – 9 July, 2015 *Coonabarabran Times*

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CIRCULATING THROUGHOUT THE WARRUMBUNGLE SHIRE

Dark Sky Park plan for Warrumbungles

Astronomers have put out a call to preserve the pristine clarity of our nation's dark skies.

by LIZ CUTTS

In what will be a first for Australia, scientists have put forward a proposal to establish a Dark Sky Park in the Warrumbungles that will promote the values of 'dark skies' and the need to prevent light pollution.

The push to create a Dark Sky Park started about 18 months ago, when **Professor Fred Watson, astronomer-in-charge of the** Australian Astronomical Observatory (AAO) near Coonabarabran received a query from Australian Geographic Magazine noting the International Dark Sky Association's recognition of the Aoraki Mackenzie International Dark Sky Reserve in New Zealand, and was interested to know why Australia did not also have an acknowledged dark-sky area.

The designation of a dark sky reserve, park or community by the International Dark Sky Association (IDA) brings recognition for the efforts made to protect the night sky from the effects of light pollution. It also raises awareness of the dark-sky area and the surrounding community, together with its staff, visitors, and the local population.

Professor Watson believes the clear, crisp, night sky above the Warrumbungles is a great natural feature that is often overlooked and he supports the plan that would preserve the ability to see our place in the cosmos.

"These types of reserves can cover many hundreds of kilometres," said Professor Watson.

"There are dark-sky parks, which are existing parks, and there are dark-sky communities, which are communities that have things in place that help to keep the night sky unspoiled by light pollution.

"The reason we have this push for a dark-sky park in the Coonabarabran region is because the Warrumbungle National Park that surrounds the Siding Spring Observatory already has certain protocols in place that are aimed at preserving the night sky - the skies there are already very dark.

"It seems to us that if you are going to have a dark-sky park in Australia this is the place it should be."

Professor Watson said the project is about raising awareness of the importance of dark skies and increasing tourism in the Warrumbungles.

"The fact is that this part of inland NSW is not only special in terms of the pristine quality of the night skies that allows the observatory to function, it is also something people like to come and see," added Professor Watson.

"By giving the Warrumbungle National Park this enhanced status we hope visitor numbers will increase, as well as an increase in dark-sky awareness. Adding the Dark Sky Park status improves knowledge amongst people who might not think about dark skies."

Important part

Professor Watson said the focus of the proposal is the Warrumbungle National Park, because it is the best defined area resulting in the National Parks and Wildlife Service potentially playing an important part in this plan.

"It is also possible that in the future the dark sky area could be expanded to include a dark sky community, which could be Coonabarabran, for example."

However selection criteria for an IDA-approved area is strict and require compliance within both the area itself and the surrounding community. With lighting regulations already in place in the Warrumbungle, Gilgandra and Coonamble Shires to protect Siding Spring Observatory, the Warrumbungle National Park is an ideal candidate to become Australia's first Dark Sky Park.

Warrumbungle Shire Council has already expressed support for the submission and recently held meetings with Coonamble and Gilgandra Shires to discuss the proposal. Professor Watson said support for the Dark Sky Park has been very favourable.

"We still have to gather up some of the statistics needed for our submission but the bottom line is that we would like to have our submission finalised by the end of the year," concluded Professor Watson.

"If successful, it will really give us something to shout about in 2016 as the Dark Sky Park in the Warrumbungles is unveiled."

The position of the Warrumbungle National Park in relation to Siding Spring Observatory makes it the best location for a Dark Sky Park.

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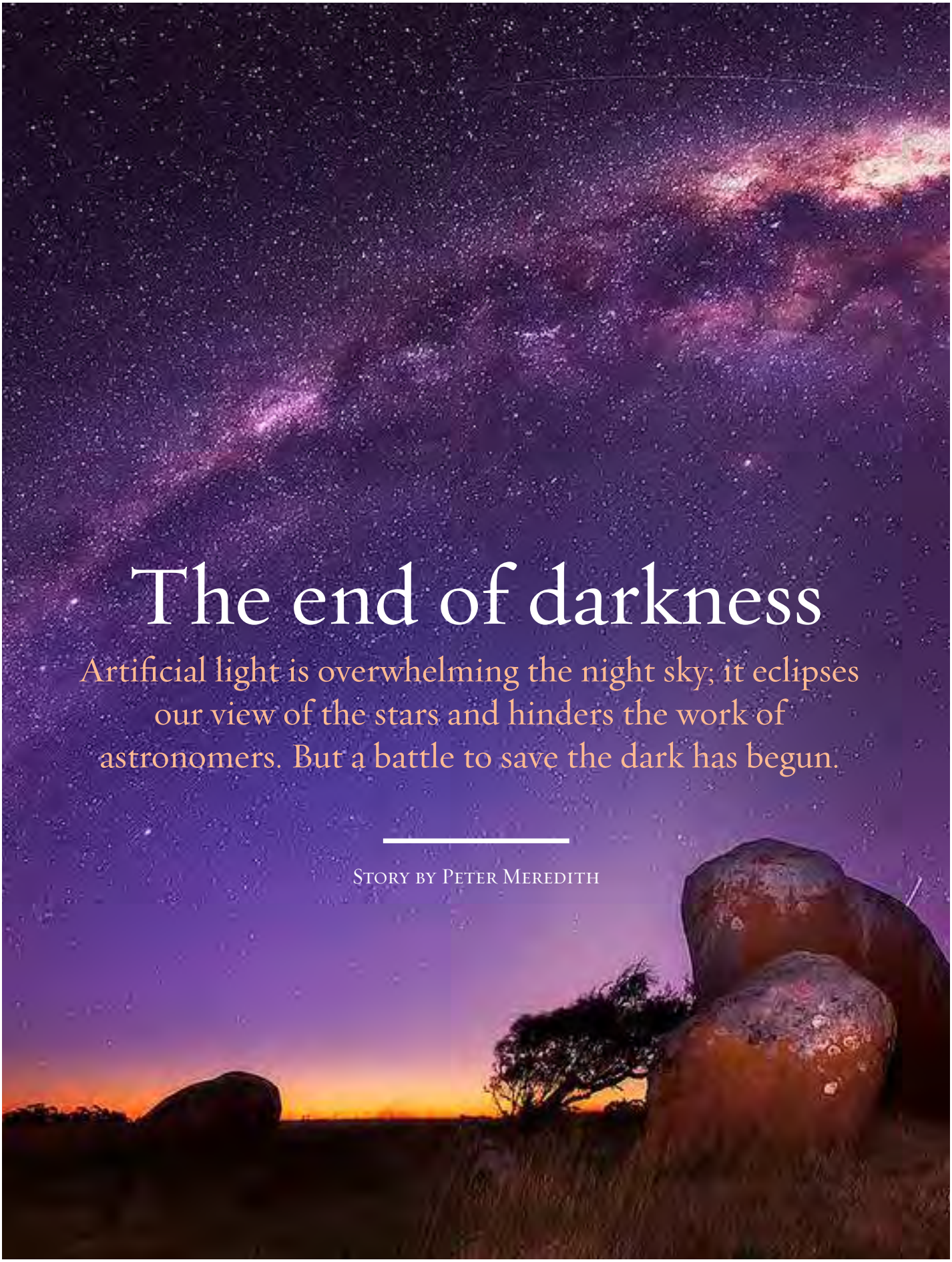

The end of darkness

Artificial light is overwhelming the night sky; it eclipses our view of the stars and hinders the work of astronomers. But a battle to save the dark has begun.

Story by Peter Meredith

Office of Environment & Heritage
NSW National Parks & Wildlife Service

Plan of Management

Warrumbungle National Park

WARRUMBUNGLE NATIONAL PARK

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service

November 2012

This plan of management was adopted by the Minister for the Environment on 26th November 2012.

Acknowledgements
This plan of management is based on a draft plan prepared by staff of the Northern Plains Region of the NSW National Parks and Wildlife Service (NPWS), part of the Office of Environment and Heritage, Department of Premier and Cabinet.

The NPWS acknowledges that this park is in the traditional country of the Gamilaraay and Weilwan Aboriginal people.

Cover photo: View from the Grand High Tops of Bluff Mountain with Tonduron Spire in background by Boris Hlavica / OEH.

For additional information or any inquiries about this park or this plan of management, contact the NPWS Coonabarabran Area Office, 30 Timor Street Coonabarabran or by telephone on 02 68421311.

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FOREWORD

Warrumbungle National Park covers an area of 23,312 hectares and is located between the towns of Coonabarabran, Gilgandra and Coonamble on the north-west slopes of New South Wales.

Warrumbungle National Park was placed on the National Heritage List in 2006 in recognition of its geological and biological values. It contains a spectacular landscape shaped by an ancient volcano which has eroded over millions of years. Over 520 species of native plants and 311 species of native animals have been recorded in the park and it provides a refuge for the endangered brush-tailed rock-wallaby.

Warrumbungle National Park contains heritage items of local and regional significance, including the Tara Woolshed, Strathmore Homestead, and walking tracks dating from the 1950s. It also contains a range of Aboriginal sites, including rock shelters and sites of cultural significance to the Gamilaraay and Weilwan Aboriginal people.

The New South Wales *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each national park. A draft plan of management for Warrumbungle National Park was placed on public exhibition from 21 October 2011 to 30 January 2012. The submissions received were carefully considered before adopting this plan.

The plan contains a number of actions to achieve the NSW 2021 goal to protect our natural environment, including monitoring of erosion and remedial works where necessary, protection of threatened species, continued revegetation of the central valley of the park, continued control of pest species, and fire management. It also contains actions to enhance recreation opportunities, including upgrading of walking tracks, upgrading of camping areas, additional picnic shelters, continuation of the annual Warrumbungle Crooked Mountain Concert and Tooraweenah Endurance Ride, and improved visitor information and interpretation.

This plan of management establishes the scheme of operations for Warrumbungle National Park. In accordance with section 73B of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

Robyn Parker MP
Minister for the Environment

TABLE OF CONTENTS

1. LOCATION, GAZETTAL AND REGIONAL CONTEXT

Warrumbungle National Park is situated on the north-west slopes of New South Wales, approximately 33 kilometres west of Coonabarabran, 90 kilometres north of Gilgandra and 75 kilometres east of Coonamble (see map 1). It adjoins the Siding Spring Observatory and covers the western end of the Warrumbungle Range. The park straddles three local government areas, Warrumbungle Shire to the east, Gilgandra Shire to the south and Coonamble Shire to the west.

A proposal to reserve the more scenic parts of the Warrumbungle Range as the "Warrumbungle National Monument" was first initiated by the National Parks and Primitive Areas Council in 1936. A national park was not declared until 1953 when 3,360 hectares of privately owned land were reserved as Warrumbungle National Park. In 1961, a re-assessment of the park led to revocation of the original reserve and re-notification of about 3,240 hectares as a Reserve for Public Recreation. The *National Parks and Wildlife Act 1967* re-established the reserve as a national park, and added a further 2,995 hectares to the park making a total of about 6,235 hectares. Since then additional lands on the boundary of the park have been added, resulting in a present park area of 23,312 hectares.

Apart from the observatory, the park is surrounded by rural properties. Cattle grazing, wool and cereal crops are the important local agricultural industries. More recently some of the larger parcels of pastoral and agricultural land around the park, particularly in the Timor Valley, have been converted into smaller rural subdivisions.

Timber production is a significant industry in the nearby Pilliga Forest. Following completion of the Brigalow Belt South Bio-regional Assessment, management of some nearby areas of State forest and other crown lands was transferred to the National Parks and Wildlife Service for conservation.

Tourism has evolved as an important contributor to the local economy, with the major attractions of the area being the national park and adjoining Siding Spring Observatory. The observatory, officially opened in 1965, was constructed on the boundary of the park partly because the park provided a light-free environment. This high-profile scientific facility consists of several internationally important telescopes and has considerable socio-economic importance to the local Coonabarabran community.

The park is within the Pilliga Subregion of the Brigalow Belt South Bioregion, the Namoi and Central West Catchment Management Authorities, and the Coonabarabran and the Weilwan Local Aboriginal Land Councils.

2. MANAGEMENT CONTEXT

2.1 LEGISLATIVE AND POLICY FRAMEWORK

The management of national parks in NSW is in the context of the legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the NPW Regulation, the *Threatened Species Conservation Act 1995* (TSC Act), and the policies of the National Parks and Wildlife Service (NPWS).

Other legislation, international agreements and charters may also apply to management of the area. In particular, the *Environmental Planning and Assessment Act 1979* (EPA Act) may require the assessment and mitigation of the environmental impacts of works proposed in this plan. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) also applies in relation to actions that may impact on threatened species listed under that Act and values of a National Heritage site.

A plan of management is a statutory document under the NPW Act. Once the Minister has adopted a plan, no operations may be undertaken within Warrumbungle National Park except in accordance with the plan. This plan of management is the third plan for this park and replaces the 1997 plan. This plan will also apply to any future additions to Warrumbungle National Park. Should management strategies or works be proposed for Warrumbungle National Park or any additions that are not consistent with this plan, an amendment to this plan or a new plan will be prepared and exhibited for public comment.

2.2 MANAGEMENT PURPOSES AND PRINCIPLES

National Parks

National parks are reserved under the NPW Act to protect and conserve areas containing outstanding or representative ecosystems, natural or cultural features or landscapes or phenomena that provide opportunities for public appreciation and inspiration and sustainable visitor or tourist use and enjoyment.

Under the Act (section 30E), national parks are managed to:

- conserve biodiversity, maintain ecosystem functions, protect geological and geomorphological features and natural phenomena and maintain natural landscapes;
- conserve places, objects, features and landscapes of cultural value;
- protect the ecological integrity of one or more ecosystems for present and future generations;
- promote public appreciation and understanding of the park's natural and cultural values;
- provide for sustainable visitor or tourist use and enjoyment that is compatible with conservation of natural and cultural values;

- provide for sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to conservation of natural and cultural values; and
- provide for appropriate research and monitoring.

National Heritage

The Commonwealth EPBC Act prescribes criteria for considering areas for listing as National Heritage places. National heritage places contain outstanding examples of natural, historic or indigenous significance to the Australian nation. On December 15 2006 Warrumbungle National Park was placed on the National Heritage List (Commonwealth of Australia, 2006) in recognition of its importance:

- as an extensive and spectacular geomorphological site with bold volcanic landforms that are unrivalled anywhere else in Australia;
- for its unique values as a transition zone between the arid western and wetter coastal zones; and
- its significance as an important refugium in inland south-east Australia.

The Warrumbungle area supports exceptionally high numbers of species, and is one of a small number of places in inland southern Australia that are centres of richness for plant and animal taxa (ANHAT 2005, cited in Commonwealth of Australia Gazette, 2006). The listing also states that the integrity and scenic vistas of the features within the Warrumbungle National Park are of outstanding value to the community.

The National Heritage management principles are established under schedule 5B of the regulations to the EPBC Act (Commonwealth of Australia, 2000). These principles state that the primary objectives for the management of National Heritage places are to identify, protect, conserve, present and transmit National Heritage values to future generations. The principles also require opportunities to be provided for continuing community and technical input in the management of National Heritage places.

2.3 STATEMENT OF SIGNIFICANCE

Warrumbungle National Park protects an area of isolated, rugged mountains at the upper reaches of the Castlereagh River Catchment. The geology, landform, climate, plants, animals, past use by Aboriginal people and early European settlers and bushwalkers, define the values of the park and the reasons for its inclusion on the National Heritage List.

- Geological, Landscape/Catchment Values: Warrumbungle National Park is a spectacular landscape shaped by an ancient volcano eroded over millions of years. About 17 million years ago, hot magma exploded through the 'Pilliga sandstone' bedrock and the formation of a huge shield-shaped volcano began. Subsequent erosion has exposed a wide array of volcanic features including lava flows, domes, vents and dykes that constitutes the best representation of exposed volcanic features within the main north south

volcanic line in eastern Australia (Duggan and Knutson 1993, cited in Commonwealth of Australia, 2006).

- Biological Values: Over 520 species of native plants and 311 species of native animals have been recorded in Warrumbungle National Park. The park provides a refuge for the endangered brush-tailed rock-wallaby (*Petrogale penicillata*). The great diversity of plant and animal life is a reflection of the varied landscape and geology, wide temperature ranges and rainfall patterns. It includes plants and animals of both the arid plains to the west and forested ranges to the east.

  Warrumbungle National Park is located within the Brigalow Belt South Bioregion. It is one of a small number of locations within the bioregion with a high concentration of significant plant species, due to the diverse range of habitats within the park.

- Aboriginal Heritage Values: Archaeological research into rock-shelters in the Warrumbungle area has shown the presence of Aboriginal people dates to at least 20,000 years before present. The park is valued by local Aboriginal people because the various sites demonstrate how Aboriginal people lived traditionally. The physical presence of the mountains looms large in the cultural identity of local people.

- Historic Heritage Values: Prior to the establishment of the park, the central valley around Wambelong Creek was used for pastoral production and some cropping. Some heritage items of local and regional significance remain from this historical period, including the Tara Woolshed and the Strathmore Homestead.

  The spectacular scenery of the Warrumbungle Mountains had attracted the attention of bushwalkers by the 1930s. Some of the walking tracks in the park date from the establishment of the park in the 1950s and now have heritage value.

- Recreation Values: The park is a popular venue for bushwalking, camping and rock climbing. Walking tracks like the Grand High Tops circuit are widely recognised as iconic bushwalks in New South Wales.

  The park is a key regional attraction for tourists. Annual visitation to the park is approximately 35,000 visitors. It is promoted by the tourism industry locally and regionally. Economic studies have shown the park has a significant beneficial impact on the local Coonabarabran economy.

- Research/Education Values: The park has been used by universities for geological and biological studies. Its geology has been progressively researched and is the subject of several publications. Since 1991, the Department of Education and Training has been operating an environmental education centre in the park for school students.

2.4 SPECIFIC MANAGEMENT DIRECTIONS

In addition to the general principles for the management of national parks (refer Section 2.2), the following specific management directions apply to the management of Warrumbungle National Park.

- Continued efforts to conserve threatened species in the park such as the brush-tailed rock-wallaby by implementing key actions in relevant recovery plans and the Priorities Action Statement (PAS).
- Providing a range of quality visitor facilities and a range of recreational experiences. The focus will be on upgrading existing facilities rather than the development of new facilities in new locations.
- Encouraging visitors to enjoy and learn about the natural features of the park in a way that does not damage the park's values.
- On-going fire management so that people and property are protected from wildfire, biodiversity values are maintained and the other objectives of this plan are achieved.
- On-going control of pest species to minimise their impact on park values.
- Protection, and where necessary restoration of natural vegetation.
- Protection of cultural heritage places in partnership with the community, particularly members of the local Aboriginal community.
- Enhanced interpretation of the park.
- Encouraging use of the park for environmental education in cooperation with the Warrumbungle Environmental Education Centre.

3. VALUES

The location, landforms and plant and animal communities of an area have determined how it has been used and valued. Both Aboriginal and non-Aboriginal people place values on natural areas, including aesthetic, social, spiritual and recreational values. These values may be attached to the landscape as a whole or to individual components, for example to plant and animal species used by Aboriginal people. This plan of management aims to conserve both natural and cultural values. For reasons of clarity and document usefulness, various aspects of natural heritage, cultural heritage, threats and on-going use are dealt with individually, but their inter-relationships are recognised.

3.1 GEOLOGY, LANDSCAPE AND HYDROLOGY

Geology, weathering and time have created the spectacular landscape that is now protected within the Warrumbungle National Park. The park contains the best representation of exposed volcanic features within the main north-south volcanic line in eastern Australia, and this contributed significantly to the park's listing as a National Heritage site.

The eroded remnants of the Warrumbungle Shield Volcano rise to a maximum of 1,206 metres above sea level at Mount Exmouth. Throughout the millions of years since volcanic activity ceased, weathering and erosion has reduced the height of the volcanic shield, exposed much of the underlying Pilliga sandstone and carried huge quantities of fine rock particles onto the surrounding countryside. Visitors driving through the park along the John Renshaw Parkway can glimpse various aspects of the sedimentary sequences underlying the area including numerous localised faults in the strata, several dyke intrusions and pyroclastic deposits. The many plugs, dykes and flows which give the skyline of the Warrumbungle Mountains such a distinctive character were also exposed by erosion. The scene that is revealed by satellite imagery is one of a great crater with huge lobes, radiating in all directions, occupying an area of nearly 600 square kilometres. The park itself takes in about one-third of this area.

The local topographic relief is considerable. The many peaks standing in excess of 1,000 metres above sea level contrast with the nearby plains to the west (maximum of 300 metres above sea level) and the hilly country to the east (about 600 metres above sea level). The rivers and creeks, which drain the Warrumbungle volcanic pile, form a radial pattern common to many volcanic landscapes. Quaternary deposits of unconsolidated sand and silt occur locally along most watercourses. The underlying Pilliga Sandstone is one of the main intake aquifers for the Great Australian (Artesian) Basin and marks the eastern margin of the Basin.

Volcanic rocks occupy the majority of the land surface of the park. Most pinnacles, peaks and mountains are dykes, plugs and domes of igneous origin and thus the steeper, higher country (above 650 metres) is generally volcanic. Dominant volcanic rock types include trachyte, trachyandesite and basalt.

The alluvial fans of the Warrumbungle Ranges form part of the recharge zone of the Coonamble embayment of the Great Artesian Basin.

Erosion is a naturally occurring process, however, recreational, management and other uses of roads, walking tracks and management trails, and fires within and adjoining the park, have the potential to accelerate levels of erosion.

Desired Outcomes

- Geological features are conserved and accelerated rates of erosion are minimised or eliminated.

- Scenic views of significant geological features and the natural skyline of the park are maintained.

Management Response

3.1.1 Locate and design upgrades to management and visitor facilities and any new facilities to minimise their physical impact and ensure scenic views are not impaired.

3.1.2 Monitor erosion on management trails, walking tracks and in visitor areas. Undertake remedial actions if needed to minimise erosion.

3.2 NATIVE PLANTS

Warrumbungle National Park is located in the Pilliga sub-region of the Brigalow Belt South Bio-region (BBS) and on the boundary with Darling Riverine Plain Bioregion. A key finding of the BBS Bioregional assessment (NPWS, 2002a) was that the Warrumbungle Mountains are a hot-spot for rare plants within the bio-region. A total of 779 plant species from 397 families and 111 genera are found within the park. This is the highest richness yet found for a reserve on the North Western Slopes (Hunter, 2008).

Under the TSC Act, strategies for the recovery of threatened species, populations and ecological communities have been set out in a state-wide Threatened Species Priorities Action Statement (PAS). A number of threat abatement actions are outlined in the PAS, including specific survey, monitoring and research actions. Individual recovery plans for particular species may also be prepared to consider management needs in more detail. One threatened plant species has been recorded in the park, the vulnerable square raspwort *Haloragis exalata* subsp. *exalata,* which grows in damp places near watercourses. However a high number of plants have been identified as being of conservation significance (Briggs and Leigh 1996), including *Acacia forsythii, Asterolasia hexapetala, Discaria pubescens, Dodonaea rhombifolia, Leionema viridiflorum* and *Persoonia cuspidifera.* Many of these plants occur on volcanic outcrops.

In 2008 a vegetation and floristic survey (Hunter, 2008) defined nine vegetation communities within the park, these are:

- Red Stringybark – Gum Scree Slopes *Eucalyptus macrorhyncha-Angophora floribunda*;
- Black Pine – Ironbark *Callitris endlicheri-Eucalyptus crebra;*
- White Box – Ironbark – White Pine *Eucalyptus albens-Eucalyptus crebra-Callitris glaucophylla*;
- Apple Gum – Yellow Box – Red Gum *Angophora floribunda-Eucalyptus melliodora-Eucalyptus blakelyi*;
- Patterson's Curse – Weeping Grass *Echium plantagineum-Microlaena stipoides*;
- Speargrass Grassland – Cleared Lands *Austrostipa scabra subsp. scabra – Austrostipa verticillata*;
- Ironbark – Bloodwood – Scribbly Gum *Eucalyptus crebra-Corymbia dolichocarpa-Eucalyptus rossii*;
- Motherumbah – Black Pine *Acacia cheelii-Callitris endlicheri*; and
- Motherumbah – White Pine *Acacia cheelii-Callitris glaucophylla*.

Benson et al (2010) defined 20 vegetation communities in the park.

Vegetation communities of the Warrumbungle Mountains and the national park show affinities with the central-western slopes and the central-western plains which lie to the east and west respectively. They also reflect variations in altitude, range, slope and aspect, and the important influence of a number of different rock or substrate types. Many species in the Warrumbungle Mountains and the national park that would usually be separated by considerable distances occur within close proximity to one another.

Generally, large-scale differences in vegetation are related to differences in soil parent material. Thus the distribution of the floristically rich and arid-adapted vegetation of lower elevations coincides with the nutrient poor soils of the Pilliga Sandstone, while less floristically diverse vegetation, generally over 650 metres above sea level, is related to the volcanic flows and deposits.

In its isolated position on the edge of the western plains, the Warrumbungle Mountains, and in particular the Warrumbungle National Park, perform an important function as a refuge for many species. The extensive changes to the ecosystems of the adjacent plain and hill country have increased this level of importance.

Although the rugged mountainous areas were grazed they remained largely free from agricultural development, while the valleys were cleared and cultivated. Approximately 12% of the park was cleared of timber for agricultural purposes before reservation of the national park, and is now grassland. For the most part, the clearings are situated on the valley floors and adjacent lower slopes on alluvium and on soils derived from the Pilliga Sandstone. Small scale clearing also occurred in the

more rugged parts of the park where some limited, yet relatively level, terraces of volcanic rock occur. Some of these areas have regenerated with dense stands of Callitris pines, but the central valley of the park is still largely cleared and has been slow to naturally regenerate, despite a program of planting native trees and shrubs from locally collected seed over many years (refer also section 3.3). A revegetation strategy (Porteners, 2003) has been prepared to guide revegetation efforts in the central valley which identifies priority areas, species and methodologies.

Desired Outcomes

- Native plant species and communities are conserved.
- Structural diversity and habitat values are restored in areas subject to past clearing, and particularly the central valley area.

Management Response

3.2.1 Implement relevant strategies in the PAS for threatened plant species.

3.2.2 Continue revegetation and exclusion fencing of the central valley in accordance with the revegetation strategy, using a combination of tree planting and direct seeding using endemic species and natural regeneration.

3.2.3 Monitor the revegetation, and revise the revegetation strategy as necessary.

3.2.4 Undertake burning for ecological purposes (e.g. to encourage germination, growth of a species or to provide habitat for threatened species) subject to environmental assessment.

3.2.5 Program and implement monitoring programs consistent with the Northern Plains Regional Biodiversity Monitoring Strategy

3.3 NATIVE ANIMALS

The Warrumbungle Mountains provide suitable habitat for many native animals. Mammals commonly found in the park include the koala (*Phascolarctos cinereus*), echidna (*Tachyglossus aculeatus*), brush-tailed possum (*Trichosurus vulpecula*), ring-tailed possum (*Pseudocheirus peregrinus*), greater glider (*Petauroides volans*), yellow-footed antechinus (*Antechinus flavipes*), common dunnart (*Sminthopsis murina*), eastern water rat (*Hydromys chrysogaster*), little brown bat (*Vespadelus pumilus*) and five species of macropods: the brush-tailed rock-wallaby; the eastern grey kangaroo (*Macropus giganteus*); the wallaroo (*Macropus robustus*); the red-necked wallaby (*Macropus rufogriseus*); and the swamp wallaby (*Wallabia bicolor*).

The population of eastern grey kangaroos in the park is particularly high. A three year research project on the population was undertaken from 1997 to 2000 (Moss, 2000). In an area of approximately 700 hectares in the central valley of the park, 2,200 eastern grey kangaroos or 3.1 kangaroos/hectare were counted. Grazing pressure from kangaroos is thought be a factor in the lack of natural regeneration

and the dominance of weeds through the central valley of the park. When native groundcovers are eaten out, conditions are more favourable for weeds that respond positively to on-going disturbance. Overgrazing is also recognised as a threat to the survival of many woodland bird and mammal species that depend on grassy understoreys.

A kangaroo exclusion fence was first erected on Belougery Flats within the park in 1987 in an attempt to reduce grazing pressure on native grasses and forbs and to reduce the dominance of weeds. This area was expanded in 1997 to cover an area of 70 hectares. Kangaroos are not totally excluded from this area. Through occasional mustering, a population density of approximately one per hectare is maintained. There has been some improvement in the recovery of native grasses and groundcovers under this regime. Weed densities have also been reduced to some extent. Further work is underway to better quantify the differences in vegetation at sites inside and outside the exclusion block and to relate this to kangaroo densities.

In contrast to the over-abundance of eastern grey kangaroos in the central valley, the brush-tailed rock-wallaby population in the park has declined to the point where it is in danger of extinction. Brush-tailed rock-wallabies are listed as endangered under the TSC Act and a recovery plan (DECC, 2008) has been prepared for this species. The main threats are thought to be fox predation and competition from feral goats (refer to section 4.1). Habitat loss may be an issue elsewhere but it is unlikely to be a problem in the Warrumbungle National Park. However the unique nature of the Warrumbungle National Park terrain, where isolated refuges are separated by many kilometres, may be an inherent limitation to the survival of the population. Several colonies have been regularly monitored over the past decade, using a variety of survey methods. The best present estimate is that the populations in the monitored colonies are stable, however, rock wallabies have disappeared from two other sites in the past five years. This has occurred despite a large program of fox and goat control.

Given the continued decline of the population, 23 captive-bred brush-tail rock-wallabies from Waterfall Springs Wildlife Sanctuary were released on Square Top Mountain in April 2009. Supplementary releases of eight animals were undertaken in February and March 2010. The aim of these releases is to raise the population to a level where recruitment overcomes reproductive constraints of low population density and allow/encourage eventual dispersal of individuals on to nearby colonies and suitable habitat (DECC, 2009).

The presence of people is known to disturb rock wallabies and consequently visitors are excluded from areas where colonies occur in the park. Visits for research and recovery activities continue and steps are taken to ensure disturbance is minimised.

The Warrumbungle National Park also contains a viable breeding population of koalas. The koala is listed as vulnerable under the TSC Act because it is an ecological specialist and its population and distribution have been severely reduced. It has poor recovery potential. The koala population within the park appears to be of considerable size and particularly healthy.

Warrumbungle National Park is home to a range of birds. Commonly seen birds include the emu (*Dromaius novaehollandiae*), wedge-tailed eagle (*Aquila audax*), peregrine falcon (*Falco peregrinus*), boobook owl (*Ninox connivens*), swift parrot (*Lathamus discolour*), white-browed scrub-wren (*Sericornis frontalis*) and turquoise parrot (*Neophema pulchella*). The regent honeyeater (*Anthochaera phrygia*), which is listed as critically endangered under the TSC Act, is a seasonal visitor and a program of banding regent honeyeaters is ongoing. In total 185 bird species have been recorded in the park.

Desired Outcomes

- Native animal species and communities are conserved.
- Brush-tailed rock-wallaby populations are increased to a viable level.

Management Response

3.3.1 Continue targeted pest control programs around known brush-tailed rock-wallaby colonies.

3.3.2 Continue to undertake actions identified in the brush-tailed rock-wallaby recovery plan.

3.3.3 Continue research and monitoring to quantify the effectiveness of exclusion fencing and to develop strategies for the management of eastern grey kangaroos in the park.

3.4 ABORIGINAL HERITAGE

Aboriginal communities have an association and connection to the land. The land and water within a landscape are central to Aboriginal spirituality and contribute to Aboriginal identity. Aboriginal communities associate natural resources with the use and enjoyment of foods and medicines, caring for the land, passing on cultural knowledge, kinship systems and strengthening social bonds. Aboriginal heritage and connection to nature are inseparable from each other and need to be managed in an integrated manner across the landscape.

The Warrumbungle Mountains is the traditional area of the language groups Gamilaraay, Kawambarai and Weilwan. The park is within the area of the Coonabarabran Local Aboriginal Land Council and the Weilwan Local Aboriginal Land Council. The NPWS liaises with members of these Land Councils along with the Burra Bee Dee Elders Group and Gamilaraay Language Circle when cultural heritage management issues arise.

Archaeological research shows Aboriginal people were hunting and gathering bush foods in the area approximately 20,000 years ago. Twenty-two Aboriginal sites have been recorded to date in the park, including burial sites, axe grinding grooves, rock engravings, with the most common being stone flakes used as implements. There

are a number of cave shelters in the park of archaeological significance. Most of the present day camping sites are situated on top of scattered artefacts from previous Aboriginal camps. Predictive modelling indicates that sites are most likely to occur on alluvial terraces along the larger creeks as well as nearby low stony ridges.

There are very few sites in the region where Aboriginal heritage is interpreted 'face-to face', despite a high level of visitor interest. Tara Cave, at the western end of the park, is an exception. It has become a focus for the interpretation of local Aboriginal culture. Guided walks, led by local Aboriginal guides, operate regularly. A track has been constructed from Pinchams Woolshed to the cave and interpretive signs have been erected. A protective cage covers the cave entrance to prevent public entry and protect the artefacts within it.

While NPWS presently has legal responsibility for the protection of Aboriginal sites and places, it acknowledges the right of Aboriginal people to make decisions about their own heritage. It is therefore policy that Aboriginal communities are consulted and involved in the management of Aboriginal sites, places and related issues and the promotion and presentation of Aboriginal culture and history. The NPWS is committed to engaging with Aboriginal communities and building relationships that enable them to take part in the ongoing management decisions for the planning area, and to benefit from this culturally, socially and economically.

Desired Outcomes

- Aboriginal places and values are identified and protected.
- Aboriginal people are involved in management of the Aboriginal cultural values of the park.

Management Response

3.4.1 Continue to consult and involve the Coonabarabran and Weilwan Local Aboriginal Land Councils, the Burra Bee Dee/Coonabarabran Aboriginal Elders group and other relevant Aboriginal community organisations in the management of Aboriginal sites, places and values, including interpretation of places or values. Only Aboriginal sites or places approved by the Aboriginal community will be open to visitation.

3.4.2 Undertake an archaeological survey and cultural assessment prior to all works with the potential to impact on Aboriginal sites and places.

3.4.3 Encourage surveys and further research into the Aboriginal heritage values of the park with the Coonabarabran and Weilwan LALC, Burra Bee Dee / Coonabarabran Aboriginal Elders Group and the Gamilaraay Language Circle. Priority for surveys will be given to areas of high recreational use, areas of potential damage from management operations such as fire trail maintenance, and areas identified as being of high priority by local Aboriginal people.

3.4.4 Require commercial tour operators who propose to visit approved Aboriginal sites or places to engage a local Aboriginal Discovery guide for the activity.

3.4.5 Undertake conservation works in consultation with the local Aboriginal community to protect Aboriginal sites if any are being negatively impacted by visitors, feral animals or any other natural or artificial processes.

3.5 HISTORIC HERITAGE

The first European record of the Warrumbungle Mountains was by Surveyor-General Oxley in 1818 on his second inland expedition. He gave the mountains the name "Arbuthnots Range", and passed close to the northern boundary of the park en route to the Pilliga and the Liverpool Plains. Oxley was followed by other explorers, who were in turn followed by bushrangers and settlers from about the 1830s. In contrast to the surrounding plains, large rugged tracts of forested lands such as the Warrumbungle Mountains were left comparatively untouched although some logging and limited grazing did take place. The central valley and edges of the park were cleared for small farms and retain evidence of this past use, including exotic species at some old homestead sites like Camp Blackman, Gunneemooroo and Greenslopes.

By the 1930s bushwalkers and rock climbers had discovered the Warrumbungle Mountains, and the first proposal for a national park was made in 1936 by the National Parks and Primitive Areas Council. World War II resulted in the proposal being deferred and it was not until January 1952 when, with the agreement of the owner, approval was given for 2,428 hectares to be withdrawn from the Crown Lease held by Mr Alfred Pincham and reserved for public recreation. On 30th October 1953 an area of 3,360 hectares was notified as Warrumbungle National Park under the care, control and management of Trustees appointed by the Minister. At the same time, in order to protect the natural vegetation on adjoining lands, some 2,300 hectares of Crown land were declared a Reserve for Public Recreation under the management of the same Trustees. This area did not actually form part of the park, though much of it was subsequently added.

Most of the walking track system was constructed between 1958 and 1962 under the Trust's direction by the first (honorary) ranger, Carl Dow. Five huts were also constructed along the Grand High Tops during this period, however Balor Hut is the only one remaining.

In 1967 the National Parks and Wildlife Service took over management of the park from the Trust. A monument to the memory of Alfred Pincham and his donation of land to the park is located at the entrance to the Pincham Trail. Another monument is located in the White Gum Lookout Car Park. It commemorates the opening of John Renshaw Parkway in 1966 and Len Stockings, who led the first vehicular crossing of the Warrumbungle Ranges in 1947.

Most structures from the pastoral period have been removed over the years since the park was proclaimed. Structures which remain include a shed, yards and concrete dam near Wheoh Peaks; yards at Gunneemooroo; Pinchams Woolshed and the Strathmore Homestead. Pinchams Woolshed is used for group accommodation, whilst Strathmore Homestead was converted to house prisoners

working on the park in 1973 and then converted again into a staff residence. Other historic features on the park include part of an old dingo fence on the High Tops; the remains of the Buckleys Creek Sawmill; the stumps of the Tara Woolshed; and the shafts of unsuccessful gold, silver and diamond mines at Tara, Wambelong Creek and Timor Rock. In addition, the early walking tracks and other works undertaken soon after the park was declared are now of historic value.

Some non-endemic plants, such as mugga ironbark (*Eucalyptus sideroxylon*), were planted in areas such as Camp Blackman and Pincham to provide shade, while other non-endemic species were planted around the old property buildings and yards. A stand of manna gum (*Eucalyptus viminalis*) was planted around the Pincham Car Park to entice koalas into the area. Many of these trees perished in the recent drought and had to be removed due to the hazard they presented to visitors.

The park is not known to contain significant valuable mineral deposits, however some exploration was undertaken in the past on a minor scale for gold, silver and diamonds. Some small, isolated mineshafts of unknown origin are listed as heritage sites. There are also a number of disused quarries along the edge of John Renshaw Parkway.

Desired Outcome

- Historic features are appropriately conserved and managed.

Management Response

3.5.1 Undertake an archaeological survey and cultural assessment prior to all works with the potential to impact on historic sites and places.

3.5.2 Maintain the Strathmore Homestead and shearer's quarters while protecting the integrity of the existing heritage fabric.

3.5.3 Maintain Balor Hut for visitor use in partnership with the Coonabarabran Bushwalking Club.

3.5.4 Maintain Pinchams Woolshed. Make alterations to allow for wheel-chair access and ensure compliance with relevant building safety codes.

3.5.5 Retain in situ the remains of the sawmill, the Tara Woolshed stumps, the monuments, and the dingo fence.

3.5.6 Record the mineshafts in the park, assess for public safety and undertake any necessary protection works.

3.5.7 Progressively record other historic places and values, assess their significance and develop appropriate management strategies.

3.6 RECREATION AND EDUCATION

Warrumbungle National Park is an iconic national park in central western New South Wales. Visitation to the park has stabilised over the last 10 years at approximately 35,000 visitors per year, with peak visitation during the Spring and Easter school holidays. Bushwalking, camping and rock climbing are the main recreational opportunities sought by visitors to the park.

Visitors primarily enter the park from Coonabarabran via the John Renshaw Parkway, which was originally constructed in 1965, or from Gilgandra via Tooraweenah. Both routes are sealed and form a tourist drive off the Newell Highway between Coonabarabran and Gilgandra. Visitors can also enter the park via unsealed roads from Coonamble and Baradine (see map 1).

Visitors to the park originate mainly from Sydney, interstate (particularly Victoria and Queensland) and other regional centres such as Dubbo, Tamworth and Newcastle. International independent travellers are also an identifiable group, particularly during summer. Large numbers of school children, mostly from NSW schools, also visit the park on school excursions. Only a small number of commercial tour operators use the park regularly. They mainly bring small groups for short stays as part of a longer itinerary.

Length of stay for visitors is generally between 2-3 days however this can vary through the year. During school holidays, for example, large groups often spend several nights in the park. At other times many use the park as a one night stop-over, en route to their destination.

3.6.1 Interpretation, Education and Information

Park facilities and services provide opportunities to enjoy, appreciate and understand the value of our natural and cultural heritage. Only areas that can sustain use are promoted in this way. Information provision at such places assists the protection of natural and cultural heritage, promotes support for conservation and increases the enjoyment and satisfaction of visitors.

Promotion of the park emphasises its spectacular scenery, its wildlife, the range of walking, camping and picnicking facilities available, and its location within close proximity to other areas of interest, such as the Siding Springs Observatory and the Pilliga Forest. Telling the story of the landscape was part of the vision of influential park pioneers like Allen Strom. He developed a network of walking tracks that did more than allow access to views - the tracks ‘walked’ visitors through a narrative of the land and its history.

An interpretive plan has been prepared for the park (NPWS, 2004). The purpose of the plan is to define the messages that need to be passed on to visitors through interpretation. It also categorises visitors into target groups (or audiences) and details how to best deliver information. The interpretive plan states that four main themes are to be interpreted in the park:

- The unique volcanic landscape, linked to other extinct volcanoes in Australia.
- Outstanding natural values with a surprising diversity of flora and fauna and important habitat for many threatened species including the brush-tailed rock wallaby.
- A long human history featuring Aboriginal people, pastoralists and recreation use.
- A bushwalker's park with a bushwalker's past.

Tourism market research has identified three different categories making up the majority of visitors to the Coonabarabran area. They are Australian families travelling mainly in school holidays; older retired couples who are self-sufficient and 'time-rich'; and young to middle-age travellers who travel alone seeking new experiences and adventure. A range of information presented through different media (e.g. website, signs, brochures, face-to face) is required to meet the varied needs of these visitor groups.

At present, the park is interpreted in a variety of ways. The NPWS website provides basic maps and information to allow visitors to find their way to and around the park. The Visitor Centre, located in the centre of the park just off the John Renshaw Parkway, provides visitors with an introduction to the park. Refurbished in 2008, a permanent interpretive display provides information on various aspects of the park based on the themes outlined in the interpretative plan. Visitor brochures provide additional maps and information. More in-depth information on geology, history, flora and fauna is available via a range of guide books.

Signs are located throughout the park, mainly on walking tracks as well as at camping and day-use areas. Their function is to orientate visitors, provide information on appropriate activities, and interpret the landscape.

Face to face interpretation is provided by Discovery Rangers and visitor centre staff. Some of these activities are used by schools, however these activities are not designed around formal educational outcomes.

The Warrumbungle Environmental Education Centre is run by the Department of Education and Training and operates out of the field studies centre located on the park at Camp Walaay. It performs an important function in providing educational information to many schools who visit the park, focusing on field based lessons that meet curriculum objectives.

3.6.2 Camping

Along with bush walking, camping is the most popular visitor activity in the Warrumbungle National Park with the peak periods being Easter and Spring school holidays.

The first camping area to be developed by the Park Trust was Wambelong Camp in 1957. In the same year a road was constructed from Wambelong Camp to Camp Pincham (i.e. Pincham's Camping Area), where minimal facilities were and continue to be provided for day visitors and campers.

With the gift of 25 hectares by Mr Blackman in 1959, the Trust established a new area for caravans, camping and day use which they named Canyon Camp. Six old Sydney trams were fitted out for holiday rental and located at Canyon Camp. In 1986, due to on-going maintenance issues, the trams were removed, camping was relocated to Camp Blackman, and the area renamed Canyon Picnic Area (see Section 3.6.3).

Existing facilities provide a range of recreational opportunities (Table 1). At one end of the range are unmodified settings like Hurleys Camp which provides opportunities for solitude. At the other end are modified areas with developed services like Camp Blackman, which provides opportunities for large numbers to camp in the park with ease and convenience.

Camp Blackman (see map 2) is the main camping area in the park and has been operating as a campsite for more than 30 years. It is located close to the site of the original "Belougery" homestead owned by the Blackman family and consists of three distinct nodes: Blackman 1 (the original Blackman campsite), Blackman 2 and Blackman 3.

Blackman 1 has 36 unpowered camp sites each with a wood barbeque, a large amenity block with hot showers, flushing toilets and a camp kitchen. The site was upgraded in 2003 and is in relatively good condition.

Blackman 2 has a powered site area that caters for approximately 25 powered sites and has the capacity to also accommodate approximately 50 unpowered sites. Blackman 2 has not been upgraded for many years and is in relatively poor condition. The area suffers from congestion and soil erosion, particularly around the powered sites which are located close to the creek.

Blackman 3 has 32 powered sites, eight unpowered sites and composting toilets. The site was developed in 2007 to replace the old powered sites at Blackman 2 and is in good condition.

Camp Walaay and Pinchams Woolshed (see map 2) are designated as group camping areas. Walaay was specifically designed to cater for large groups and buses and was completed in 2001. It has five camping nodes located around a circular access road. The largest node can accommodate up to three buses and 150 people. Visitors to these sites are required to book in advance. Both Walaay and Pinchams Woolshed provide basic amenities for groups, particularly schools such as composting toilets and communal fireplaces. They also provide an overflow area for other campers during peak times such as Easter.

Gunneemooroo, located in the far south of the park (see map 1), has no facilities other than pit toilets.

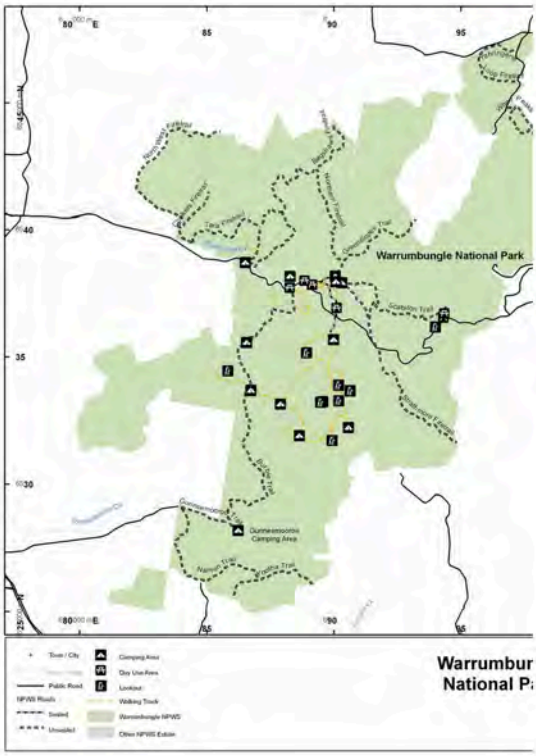
Walk-in pack camping occurs at the old hut sites on the Pincham Trail, although most sites have no water supply or toilets. Balor Hut is the only remaining hut on the trail and is maintained by the Coonabarabran Bushwalking Club. The hut is locked and visitors must book and obtain a key to the hut through the Visitor Centre.

Table 1: Camping area facilities

Designated Camping Area	Number of camp sites	2WD Vehicular Access	4WD Vehicular Access	Caravans/ campervans permitted	Toilet /shower Facilities	Composting Toilet	Gas BBQs	Wood fires permitted in fireplaces	Communal Fire place	Tables	Information Panels/ shelter
*Camp Blackman											
Powered (B3)	31	✓	✓	✓		✓			☑		✓
Un-powered (B1)	36	✓	✓	✓	✓		✓	✓			
Un-powered (B2)	75	✓	✓	✓		✓		✓	☑	✓	
*Walaay (group camping)	6	✓	✓		✓	✓	✓		✓	✓	
*Wambelong	35	✓	✓	✓	✓	✓				✓	
Pincham (walking access only)	6				✓	✓				✓	
Balor Hut (walking access only)	3				✓	✓					
Dows (walking access only)	3										
Ogma (walking access only)	6										
Danu (walking access only)	3										
Burbie (walking access only)	10										
Hurleys (walking access only)	3										
Gunneemeeroo	10		✓	✓							

Campsite numbers are existing except for Balor Hut
✓ **facility provided**
☑ **facility proposed**

Firewood collection has been a long-standing issue in the park as it causes damage to the natural environment and habitat. Firewood collection is not permitted in the park, however firewood may be purchased outside the park for use in specified areas. Wood barbecues in Canyon Picnic Area have been removed and replaced with electric barbecues. Metal fireplaces which only allow small fires have been placed in Camp Blackman and Camp Wambelong. New gas cooking plates have also been placed in Camp Blackman. Large fire-pits, to restrict large groups to a single communal fire, have been placed in Camp Walaay. Fireplaces are not provided at pack camping sites, however campfires at these sites continue.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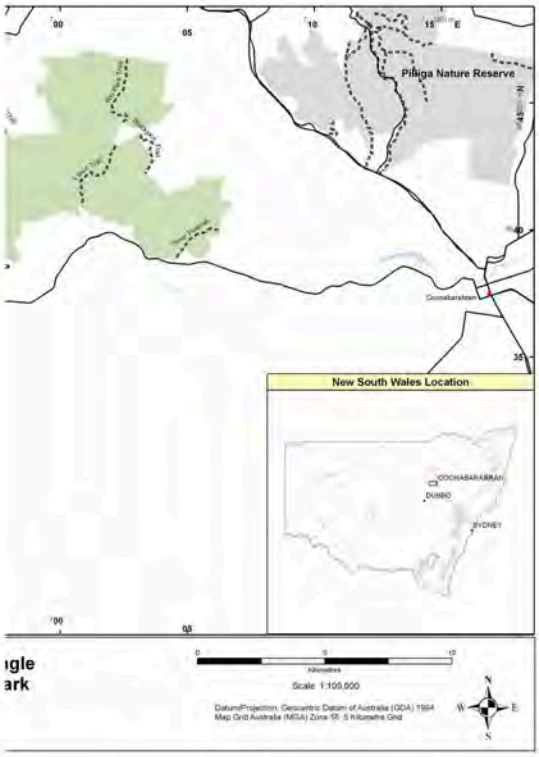
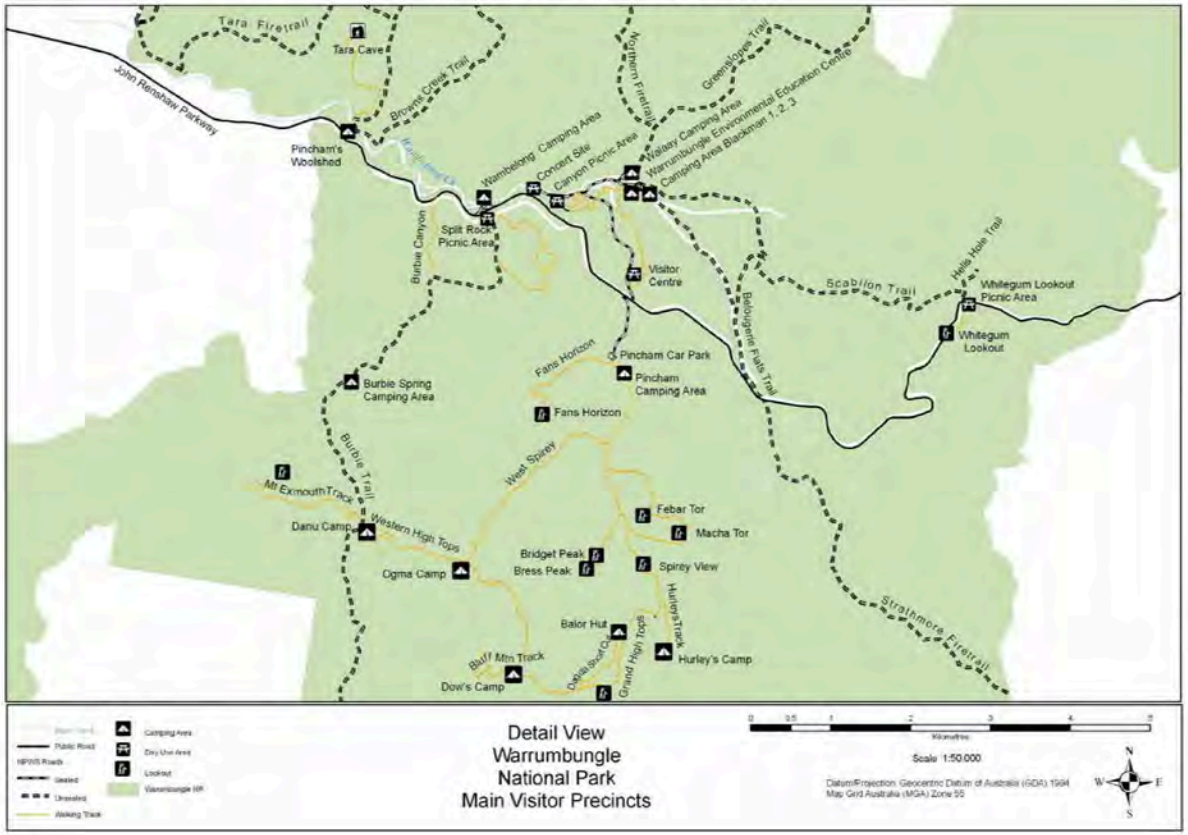

Pilliga Nature Reserve
New South Wales Location
COONABARABRAN
DUBBO
SYDNEY
Scale 1:100,000

MAP 2 MAIN VISITOR PRECINCTS



3.6.3 Day Use

There are three designated day use areas within the park located at Canyon Picnic Area, Split Rock Car Park and White Gum Lookout Car Park (see map 2), however day visitors are not excluded from camping areas or facilities.

Previously used as the main camping area within the park, Canyon Picnic Area is now the primary day use area. The site consists of a car park, composting toilet, four electric barbecue shelters each with two barbecues, picnic tables and water tanks. A decommissioned toilet block and an old picnic table are the only remnants of the camping ground that once occupied the site.

At the western end of Canyon Picnic Area is a large open grassy area where the annual Warrumbungle Crooked Mountain Concert has been held since 2003 (see section 3.6.8). In recent years minor modifications, including a parking bay for food vendors at the concert, have been completed.

Basic day use facilities are located at the track heads to White Gum Lookout and Split Rock Circuit (see map 2). At the White Gum Lookout Car Park is a small picnic area with two picnic tables. Split Rock Day Use Area comprises a small paved area adjacent to the track head and car park with picnic tables, an interpretative sign, and a composting toilet that is often used by campers from nearby Wambelong Camping Area.

3.6.4 Walking Tracks

Walking, along with camping, is the most popular activity undertaken in Warrumbungle National Park. There are approximately 50 kilometres of walking track in the park. The majority were constructed between 1958 and 1962 and the steep grades necessitate ongoing maintenance. Maintenance over recent years has focussed on repairs to the main Pincham Trail (see map 2). Sections of the track have been paved and a large steel staircase has been constructed below Balor Hut and the Breadknife. The walking track to Tara Cave (see map 2) has also been significantly upgraded over recent years. The upper end of the track has been paved and a steel viewing platform has been constructed at the cave itself.

A strategy to guide management and maintenance of walking tracks has been prepared (NPWS, 2003). The strategy outlines the approach to maintenance and upgrade of the track network between 2004 and 2013. Sections which are degraded and require repair are identified for each track and all tracks are given a classification based on the Australian standard. Indicative costs and a priority list are provided. The strategy identifies tracks which will require further paving, and others where natural surfaces should be retained.

The walking tracks in the park are listed in Table 2.

Table 2: Walking Tracks

Walking Track	Distance (km)	Current Standard	Proposed Standard
Whitegum Lookout	**0.5**	All access path (Class 1)	All access path (Class 1)
Gurianawa Track	**1.0**	All access path (Class 1)	All access path (Class 1)
Wambelong Nature Track	**1.1**	Walking Track (Class 3)	Walking Track (Class 3)
Fan's Horizon	**2.5**	Walking Track (Class 3)	Walking Track (Class 3)
Pincham Trail	**6.4**	Walking Track (Class 3)	Walking Track (Class 3)
Dagda Shortcut	**1.2**	Hiking Track (Class 4)	Hiking Track (Class 4)
Bluff Mountain	**1.3**	Hiking Track (Class 4)	Hiking Track (Class 4)
Gould's Circuit	**3.0**	Walking Track (Class 3)	Walking Track (Class 3)
Spirey View	**0.15**	Walking Track (Class 3)	Walking Track (Class 3)
Hurley's Track	**0.15**	Hiking Track (Class 4)	Hiking Track (Class 4)
Dow's High Tops	**3.4**	Walking Track (Class 3)	Walking Track (Class 3)
West Spirey Creek Track	**3.15**	Walking Track (Class 3)	Walking Track (Class 3)
Western High Tops Track	**1.55**	Walking Track (Class 3)	Walking Track (Class 3)
Cathedral and Arch Track	**0.52**	Hiking Track (Class 4)	Hiking Track (Class 4)
Mt Exmouth	**2.6**	Hiking Track (Class 4)	Hiking Track (Class 4)
Bress Peak	**1.1**	Hiking Track (Class 4)	Hiking Track (Class 5)
Burbie Canyon Track	**1.0**	Walking Track (Class 3)	Walking Track (Class 3)
Tara Track	**2.0**	Graded Path (Class 3)	Graded Path (Class 2)
Split Rock Walking Track	**4.6**	Hiking Track (Class 4)	Hiking Track (Class 4)

Walking Track Classification System AS 2156.1. There are six classes of walking tracks outlined in this standard with Class 1 being the most developed and suitable for all access through to Class 6 which is an unmarked route.

3.6.5 Horse Riding

Horse riding was not permitted in the park until an amendment to the Plan of Management was approved in 2005. The amendment followed representations from the organisers of the Tooraweenah Endurance Ride to allow the riders to use a short section of fire trail in the south western corner of the park for their annual ride.

The Tooraweenah Endurance Ride has been held most years since 2005. The section of ride in the park is a one day event and has been restricted to Namen and Yootha management trails (see map 1). A limit of 80 riders has been imposed since the trial event in 2005 and post event inspections indicate that impacts on the trails and other park values have been minimal.

3.6.6 Cycling

Cycling, particularly mountain bike riding is becoming an increasingly popular activity in the park, particularly during the school holidays. The flatter areas of the park provide opportunities for less experienced riders and families. The long and somewhat steeper management trails offer more challenging opportunities for experienced mountain bike riders.

Several organised bicycle rides through the park have been organised in the past, with up to 60 riders participating.

3.6.7 Adventure Activities

The main adventure activities undertaken in the park are rock climbing and abseiling, and to a lesser extent orienteering/rogaining.

After walking, camping and scenic driving, the most popular activity undertaken in the park is rock climbing. There are four main climbing areas in the park - Crater Bluff, Belougery Spire, Tonduron and Bluff Mountain. They offer some of the best traditional long climbing routes in Australia. Rock climbers are required to register at the Visitor Centre before climbing in the park.

Some locations are not available for rock climbing and controls are imposed on available sites to protect plant and animal communities of environmental significance, to protect fragile geological structures, to prevent rock climbing in close proximity to walking tracks, and to maintain the adventure climbing experience.

3.6.8 Events and Commercial Activities

The Warrumbungle Crooked Mountain Concert is an annual music event held in the park that arose from the Warrumbungle National Park jubilee celebrations in 2003. The purpose of subsequent concerts was to engage the community, attract new visitors and a different visitor type to the park, and to increase visitor numbers during a period of generally low visitation.

The concert is held at the western end of Canyon Picnic Area (see map 2) and features contemporary musical performers, children's entertainment, as well as food and beverage stalls. All stage and sound equipment, power generators and toilet facilities are brought in to the park for the concert. The concert attracts between 500 and 2,400 people, many of whom camp in the park for the weekend of the concert. The largest concert crowd was in 2007 with over 2,400 people.

Commercial tour operators occasionally use the park.

Large group activities and competitive events (such as a cycling or running event on management trails) require a licence or consent from NPWS, and commercial operations require a licence from NPWS.

Desired Outcomes

- Visitor use is appropriate and is ecologically sustainable.
- The range of walking tracks, camping facilities and activities within the park is maintained.
- Park values are not diminished by ongoing visitor activity.

- Visitor use and services encourage appreciation of the park's values.
- A range of education and interpretation programs are provided to cater for diverse visitor needs.

Management Response

3.6.1 Implement the actions outlined in the Warrumbungle National Park Walking Track Strategy 2004, Precinct Plan 2002 and Interpretation Strategy 2004 and ensure these documents are reviewed and updated as required.

3.6.2 Promote use of the park for low-key nature based activities such as bushwalking, camping, cycling, photography, bird watching and nature study.

3.6.3 Promote park visitation out of peak seasons to increase overall visitation without impacting on park values or the visitor experience.

3.6.4 If necessary, introduce a booking system to limit numbers of campers in certain areas to prevent overcrowding and conflict between users, permit revegetation, and/or to protect fragile geological features or native species.

3.6.5 Close sections of camping areas and undertake rehabilitation works as necessary to protect the natural environment, in particular threatened species.

3.6.6 Investigate options and determine the feasibility of introducing a policy of visitors removing their own rubbish.

3.6.7 Monitor visitation and visitor use patterns within the park through surveys, vehicle and pedestrian counters on roads and walking tracks and regular park user fee compliance checks at camping areas and car parks.

3.6.8 Develop and implement a visitor impact monitoring system for the park to assess and monitor environmental impacts in camping areas and on walking tracks to enable decisions about site protection, and protection of significant species or communities.

3.6.9 Redevelop Blackman 2 to address erosion, protection of Aboriginal sites and protect the creek bank and riparian vegetation. Remove old power outlet infrastructure, remove campsites within 20 metres of Mopra Creek to create a vegetation buffer along the creek, improve the access road and formalise parking and camping areas.

3.6.10 Develop a key pick-up and fee collection system with the Visitor Centre and Tooraweenah businesses for vehicular access to Gunneemooroo camping area, which will remain a basic camping area with no new facilities provided.

3.6.11 Develop and implement a communications strategy to inform visitors of changed access requirements for Gunneemooroo including new or additional signage and amendments to web site.

3.6.12 Gate the management trail which passes through the Gunneemooroo camping area just past the camping area to prevent public vehicle access beyond this point.

3.6.13 In conjunction with Gilgandra Shire Council, improve the safety of the Pinchams Woolshed vehicle entry point from the John Renshaw Parkway.

3.6.14 Develop and install interpretative signage at Pinchams Woolshed outlining the history and values of the Pinchams Woolshed and identifying the Tara Cave track head.

3.6.15 Options for providing better access to shower facilities for campers at Walaay and Blackman 3 will be explored. They include providing all weather access across Wambelong Creek to the amenity block or the provision of shower facilities at Camp Blackman 3. The most cost effective and practical option will be implemented.

3.6.16 Continue to allow walk-in pack camping at Balor Hut, Danu Camp, Dows Camp, Gales Bore, Hurleys Camp, Ogma Camp and Burbie Spring. Pack camping is also permitted at other sites within the park that are at least 500 metres from roads.

3.6.17 Develop 2-3 small tent sites alongside Balor Hut in order to alleviate soil erosion and improve camping facilities.

3.6.18 Continue to require walk-in pack campers to register at the Visitor Centre to provide information on numbers and location and to encourage appropriate behaviour. Limits will be placed on the size and number of groups seeking pack camping if necessary to reduce visitor impacts on pack camping sites.

3.6.19 Provide minimal impact camping information at the Visitor Centre and at walk-in pack camp sites. This will include information that no wood fires are permitted at pack camp sites and fuel stoves must be used for cooking.

3.6.20 Permit wood fires only within barbecues or communal fire places provided in camping areas. Additional gas cooking facilities may be installed to further reduce the impact of wood fires.

3.6.21 Maintain and upgrade walking tracks to the standards listed in table 2 (section 3.6.4) in accordance with the Warrumbungle National Park Walking Track Strategy.

3.6.22 Review and upgrade directional signage on walking tracks.

3.6.23 Permit horse riding by consent on Namen and Yootha management trails (see map 1), consistent with the NPWS Horse Riding Policy and subject to the conditions of consent and monitoring of environmental impacts.

3.6.24 Allow cycling on roads and management trails.

3.6.25 Continue to prohibit rock climbing on the Breadknife, and on Chalkers Mountain, Square Top Mountain and Black Jack Mountain to prevent disturbance to rock wallabies. Rock climbing is generally permitted on all other peaks within the park, although temporary seasonal closures or other restrictions on times and numbers of climbers may be imposed if necessary. Marking or bolting of climbing routes is prohibited. Climbers are encouraged to register at the Visitor Centre.

3.6.26 Extend the current barbecue shelters at Canyon Picnic Area to provide additional shelter for picnic tables.

3.6.27 Continue to permit an annual concert in the park. Limit attendance at the concert to 2000 people. Install an electricity transformer and underground cabling at the concert site if a cost/benefit analysis indicates it is feasible.

3.6.28 Improve interpretation in the park by improving signs and providing a range of education and interpretation programs in accordance with the park interpretation plan.

3.6.29 Continue to promote face-to-face interpretation through the corporate Discovery program. Ensure the program is run at a level that is meeting demand and encourage the use of Aboriginal Discovery staff where appropriate.

3.6.30 Encourage use of the park for environmental education purposes. The activities of the Warrumbungle Environmental Education Centre will be promoted through the Visitor Centre and where appropriate in visitor information material.

3.6.31 Develop a written agreement with the Department of Education and Training outlining the partnership and site use conditions with the Warrumbungle Environmental Education Centre.

4. ISSUES

4.1 WEEDS AND PEST ANIMALS

An introduced species is defined in this plan as any plant or animal species not native to the park. Introduced species within the park and on adjoining land are of concern because they have the potential to have detrimental effects on ecological values and can spread to and from neighbouring land.

In addition, the NPWS has a number of statutory responsibilities in relation to pest management. The *Noxious Weeds Act 1993* identifies noxious weeds and their respective control measures, as well as the roles and responsibilities for their control for both public and private land managers/owners. The *Rural Lands Protection Act 1998* binds the Crown for the control of pest animals declared under that Act. This includes rabbits, wild dogs and feral pigs, which must be controlled to the extent necessary to minimise the risk of the pest causing damage to any land.

Weeds are a particular problem in areas of the park which were previously cleared, then used for grazing and cropping. Blue heliotrope (*Heliotropium amplexocaule*) is of concern both within the park and on adjacent properties. Other weed species of concern include Patterson's curse (*Echium plantagineum*), blackberry (*Rubus fruticosus)*, prickly pear (*Opuntia spp.)*, sweet briar (*Rosa rubiginosa)*, Noogoora burr (*Xanthium strumarium)*, khaki burr (*Alternanthera pungens)*, green cestrum (*Cestrum parqui)*, St Johns wort (*Hypericum perforatum)* and spiny burr grass (*Cenchrus incertus)*. There is some concern that Coolatai grass (*Hyparrhenia hirta)* and bridal creeper (*Myrsiphyllum declinatum)* may be emerging weed issues because they have recently been found close to the park. Current and emerging pest issues are dealt with in the Northern Plains Region Pest Management Strategy (DECC 2007).

Control of weeds has included herbicide treatment in campgrounds, picnic areas and roadsides, planting of native tree species and the erection of exclusion fencing in the central valley, and the introduction of bio-controls. Results of control programs have been mixed. Small infestations of St Johns wort and spiny burr grass have been controlled and prevented from spreading across large areas. Infestations of blackberry, green cestrum and sweet briar have responded to treatment and been reduced, however attempts to control blue heliotrope have been limited to small high priority areas that can be regularly treated. The erection of an exclusion fence around 70 hectares of the central valley has reduced both the density of this weed and possibly the amount of seed in the soil in this area. On-going planting of native trees has also helped in some areas as the density of heliotrope seems to be reduced under shade and leaf litter. The blue heliotrope leaf feeding beetle (*Deuterocampta quadrijuga*) was introduced in 2001 but has not yet proven to be an effective control.

Introduced animals found in the park include rabbits (*Oryctolagus cuniculus*), foxes (*Vulpes vulpes*), feral cats (*Felis catus*), wild dogs (*Canis lupis*), goats (*Capra hircus*) and pigs (*Sus scrofa*). Control is undertaken in accordance with the Northern Plains Region Pest Management Strategy (DECC 2007). The highest priority is to reduce the impacts of goats and foxes around known habitats of brush-tailed rock-wallabies.

Goats impact on brush-tailed rock-wallabies through competition for food and shelter. They also contribute to soil erosion and through selective grazing can have substantial impacts on some of the sensitive vegetation found within the park. Where goats are present, it is noticeable that some of these plants can be heavily grazed. This may threaten the survival of some sensitive vegetation populations in the park and further investigation is therefore required. Goats are controlled via aerial shooting programs which usually occur twice a year. The presence of goats at selected rock-wallaby colonies is monitored by pellet plot counts. Results indicate that control is successful and the current effort is maintaining numbers at a low level. However re-infestation is a constant problem. Ground-based shooting is also occasionally used, for example when goats are moving down into valleys during drier conditions.

The park is identified as a priority fox control area under the NSW Fox Threat Abatement Plan (Fox TAP) to protect the endangered population of brush-tailed rock-wallabies within the park. Fox control is undertaken via intensive ground baiting and targeted ground shooting and is aimed at minimising predation on brush-tailed rock-wallabies. Since the implementation of the Fox TAP in 2001 NPWS has increased the amount of fox control undertaken in the park. In the recent past Landcare groups, the Namoi Catchment Management Authority and the Central North Livestock Health and Pest Authority have supported a coordinated baiting program on neighbouring properties aimed at creating a fox control buffer around the brush-tailed rock-wallaby colonies. Monitoring of fox tracks show that the number of foxes is reduced and is consistently much lower than numbers recorded outside the park, however reinfestation is a problem.

Rabbits, which are mainly found in the central valley, can affect revegetation programs unless kept under control. Rabbit control is a priority. Various control methods are used including ripping and fumigating warrens, poisoning and the release of Myxomatosis and Rabbit Calicivirus Disease.

Feral pigs cause damage to vegetation, spread weeds, contaminate water, damage fences, and predate on small native animals. Pig activity is regularly monitored and populations are controlled by trapping, shooting and baiting.

Cats are a threat to small animals. They are difficult to control. Traps are set in response to sightings, particularly around visitor areas. Elsewhere in the park they are shot.

Wild dogs can have significant impacts on neighbouring sheep and goat producers. In recent years a small number of stock attacks from wild dogs have occurred on properties adjoining Warrumbungle National Park. Control programs, mainly via soft-jaw trapping, have been undertaken in response to these stock attacks.

Desired Outcomes

- Introduced plants and animals are controlled and where possible eliminated.
- Pest control programs are undertaken where appropriate in consultation with neighbours and local land management authorities.

Management Response

4.1.1 Control introduced species in accordance with the Northern Plains Regional Pest Management Strategy. Control methods may include herbicides, bio-controls, trapping, baiting and aerial and ground shooting.

4.1.2 Monitor noxious and significant environmental weeds. Treat any new outbreaks where possible.

4.1.3 Implement the threat abatement plan for foxes in the park to reduce their impact on the brush-tailed rock-wallaby population. Undertake control where possible in cooperation with the Central North Livestock Health and Pest Authority, Landcare and the Namoi and Central West CMAs.

4.1.4 Continue to seek the cooperation of neighbours in implementing weed and pest control programs.

4.1.5 Ensure stock are removed from the park as soon as possible.

4.1.6 Assess existing boundary fencing and where required provide assistance under the terms of the NPWS boundary fencing policy to ensure effective fencing is in place.

4.2 FIRE

The primary fire management objectives of the NPWS are to protect life and property and community assets from the adverse impacts of fire, whilst managing fire regimes to maintain and protect biodiversity and cultural heritage.

Fire is a natural feature of many environments and is essential for the survival of some plant communities. However, inappropriate fire regimes can lead to loss of particular plant and animal species and communities, and high frequency fires have been listed as a key threatening process under the TSC Act. Past research indicated that fire was detrimental to brush-tailed rock-wallabies, however recent research has indicated that the benefits of fire in providing new food sources may outweigh the negative impacts. An amendment to the previous plan of management was adopted in 2003 to permit controlled burning for ecological purposes to take place in and around rock-wallaby colonies.

Fire incidence in the park is low. Wild fires generally travel from west to east through the park, usually ignited by lightning, and spread under the influence of hot northerly and westerly winds. The majority of the park has not been affected by wildfire for many years. The last large fire occurred in the 1950s. A major fire in 1967 also burnt over 5,000 hectares of the park. More recently, in 2001 a wildfire burnt approximately 3,000 hectares around Mount Exmouth, whilst another similar-sized fire at nearby Angels Gap was prevented from spreading into the park.

A fire management strategy has been prepared for the park (NPWS, 2001). The fire management strategy outlines the recent fire history of the park, key assets within and adjoining the park including sites of natural and cultural heritage value, fire management zones which includes asset protection zones, and fire control advantages such as management trails and water supply points. Hazard reduction programs, ecological burning proposals and fire trail works are discussed with other stakeholders in the Castlereagh and North West Bush Fire Management Committees.

Desired Outcomes

- Life, property, and natural and cultural values are protected from fire.
- Fire regimes are appropriate for conservation of native plant and animal communities.

Management Response

4.2.1 Implement the Warrumbungle National Park Fire Management Strategy. Regularly review and update the strategy.

4.2.2 Continue to participate in the Castlereagh and North West Bush Fire Management Committees. Maintain cooperative arrangements with local Rural Fire Service brigades, fire control officers, other fire authorities, the Siding Spring Observatory and surrounding landowners in regard to fuel management and fire suppression.

4.2.3 Manage fire in the park to protect assets and biodiversity in accordance with the fire regimes/thresholds identified in the fire management strategy.

4.3 CLIMATE CHANGE

Climate change has been listed as a key threatening process under the TSC Act. Projections of future changes in climate for NSW include higher temperatures, increasing sea levels and water temperatures, elevated CO_2, more intense but possibly reduced annual average rainfall, increased temperature extremes and higher evaporative demand. These changes are likely to lead to greater intensity and frequency of fires, more severe droughts, reduced river runoff and water availability, regional flooding, increased erosion and ocean acidification.

Climate change may significantly affect biodiversity by changing population size and distribution of species, modifying species composition, and altering the geographical extent of habitats and ecosystems. The potential impact of climate change is difficult to assess since it depends on the compounding effects of other pressures, particularly barriers to migration and pressure from feral animals. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes or with slow growth rates.

Programs to reduce the pressures arising from other threats, such as habitat fragmentation, invasive species, bushfires, pollution and urban expansion, will help reduce the severity of the effects of climate change.

Desired Outcome

- The effects of climate change on natural systems are reduced.

Management Response

4.3.1 Continue existing fire, pest and weed management programs to increase the ability of plant and animal communities to cope with future disturbances, including climate change.

5. MANAGEMENT OPERATIONS AND OTHER USES

In order to achieve protection of the values of the park, to provide opportunities for visitors and to facilitate management operations, it is important to build and maintain appropriate infrastructure. Infrastructure may also be provided on the park by other authorities or for other purposes authorised under the NPW Act.

A workshop and small office is located on the park for field staff. Staff accommodation is available at the Strathmore Homestead and quarters. The quarters are regularly used by visiting staff, researchers, volunteers and contractors.

A number of management trails that are not available for public vehicle access are located on the park. They are used regularly in pest control and fire management. A helipad is located close to the workshop at Strathmore.

Rubbish is removed from the park under contract. Recycling bins for aluminium cans and bottles are provided at Camp Blackman and the Visitor Centre. Rubbish bins are provided at all car-based camping areas and the main day use areas. Throughout the remainder of the park, campers and day visitors are required to remove their own rubbish.

Sewerage disposal in the park is by septic systems. The NPWS has in recent years invested substantial funding and infrastructure in upgrading the system to make sure it complies with current Australian standards. The septic tanks and pumps at Camp Blackman have been overhauled. The black-water and grey-water from Camp Blackman is pumped via a new pipeline to evaporation ponds in a nearby area known as Greenslopes. The ponds have been lined with specialised black plastic to ensure that no effluent escapes into the ground and also to increase evaporation rates. However, the ponds do not have the capacity to always cope with the volumes of effluent generated by visitors. If high visitor use corresponds with high rainfall for example, the ponds can fill quickly. The levels are monitored and in certain circumstances it is necessary to spray some of the effluent around the ponds to increase evaporation. The possibility of using grey-water to water a 'woodlot' on the clearing adjacent to the ponds has also been under investigation as another measure to reduce pond levels.

Due to the age of the main Camp Blackman amenities block, it is expected that at some point during the life of this plan the facilities will need to be replaced.

Water for domestic purposes is extracted under licence from 2 bores and a well located along Wambelong Creek. Water consumption has been reduced in recent years through the introduction of timed and low flow rate showers. This has also reduced the input of effluent to the evaporation ponds. New composting toilets at Camp Blackman, Camp Walaay and Canyon Picnic Area have significantly reduced the amount of water being used at the main amenities block and the amount of effluent produced. The bore water in the park contains many dissolved minerals that react with the pipes and water heaters reducing their life span. In 2009 a water conditioning system that removes many of these reactive minerals was installed to improve the water quality, reduce maintenance and cyclic replacement of pipes and water heaters.

Power is supplied into the park by the original overhead homestead line from the west. This has a limited capacity that has been reached with the present developments in the park. The line is managed by Country Energy. The power line is under continual threat from overhanging or falling branches and trees and this situation has worsened in the recent drought which has caused the death of many large trees. There are both environmental and economic constraints on relocating the line. Some small sections have been realigned. Maintaining a clearing along the line is essential if power is to be supplied to the infrastructure in the park.

Telephone services were previously supplied via another overhead line through the western end of the park. This service was unreliable, again due to trees continually falling over the line in storms. Telstra installed a new radio tower at the Visitor Centre to receive signals from the Needle Mountain tower. This has improved the capacity and reliability of the telephone services and allowed for the removal of approximately 5 kilometres of telephone lines in the park.

The John Renshaw Parkway is managed by Gilgandra Shire and passes through the centre of the park.

The Siding Spring Observatory is located on the eastern boundary of the park and a Telstra tower is located just outside the southern park boundary on Mt Cenn Cruaich. Access roads to the observatory and tower are also located outside the park.

A Regional Environmental Plan has been prepared which establishes thresholds for light emissions which have the potential to affect observations of the night sky from the Siding Spring Observatory. The existing and proposed development areas within Warrumbungle National Park are within 18 kilometres of the observatory and all permanent lighting in the park must be in accordance with the constraints imposed by the Regional Environmental Plan.

A water pipeline to the Observatory passes through a small section of the park along Timor Road. An easement agreement with the Australian National University has been completed to cover maintenance access to the park for the pipeline.

Desired Outcomes

- All infrastructure functions effectively and efficiently.
- Existing non-park infrastructure is managed to minimise impacts on natural and cultural values.
- Improve the sustainability and safety of management facilities and infrastructure.
- Amenities are clean, safe and of an acceptable standard.

Management Response

5.1 Develop a tree lot to use excess grey water from the waste water treatment ponds in accordance with regulations.

5.2 All new toilet facilities will be composting toilets where practical.

5.3 Where feasible, install solar power and rainwater tanks to buildings.

5.4 Investigate options and implement recommendations for upgrading or replacing the Camp Blackman amenity block.

6. IMPLEMENTATION

This plan of management establishes a scheme of operations for Warrumbungle National Park.

Activities identified in the plan are listed in the table below. Relative priorities are allocated against each activity as follows:

- **High** priority activities are those imperative to achievement of the objectives and desired outcomes. They must be undertaken in the near future to avoid significant deterioration in natural, cultural or management resources.
- **Medium** priority activities are those that are necessary to achieve the objectives and desired outcomes but are not urgent.
- **Low** priority activities are desirable to achieve management objectives and desired outcomes but can wait until resources become available.
- **Ongoing** is for activities that are undertaken on an annual basis or statements of management intent that will direct the management response if an issue that arises.

Table 3: Implementation Priorities

Management Response	Priority*
Geology, Landforms and Hydrology	
3.1.2 Locate and design upgrades to management and visitor facilities and any new facilities to minimise their physical impact and ensure scenic views are not impaired.	Ongoing
3.1.2 Monitor erosion on management trails, walking tracks and in visitor areas. Undertake remedial actions if needed to minimise erosion.	Ongoing
Native Plants	
3.2.1 Implement relevant strategies in the PAS for threatened plant species.	High
3.2.2 Continue revegetation and exclusion fencing of the central valley in accordance with the revegetation strategy, using a combination of tree planting and direct seeding using endemic species and natural regeneration.	High
3.2.3 Monitor the revegetation, and revise the revegetation strategy as necessary.	Medium
3.2.4 Undertake burning for ecological purposes (e.g. to encourage germination, growth of a species or to provide habitat for threatened species) subject to environmental assessment.	Ongoing
3.2.5 Program and implement monitoring programs consistent with the Northern Plains Regional Biodiversity Monitoring Strategy	Ongoing
Native Animals	
3.3.1 Continue targeted pest control programs around known brush-tailed rock-wallaby colonies.	High

3.3.2	Continue to undertake actions identified in the brush-tailed rock-wallaby recovery plan.	Ongoing
3.3.3	Continue research and monitoring to quantify the effectiveness of exclusion fencing and to develop strategies for the management of eastern grey kangaroos in the park.	Medium
Aboriginal Heritage		
3.4.1	Continue to consult and involve the Coonabarabran and Weilwan Local Aboriginal Land Councils, the Burra Bee Dee/Coonabarabran Aboriginal Elders group and other relevant Aboriginal community organisations in the management of Aboriginal sites, places and values, including interpretation of places or values. Only Aboriginal sites or places approved by the Aboriginal community will be open to visitation.	Ongoing
3.4.2	Undertake an archaeological survey and cultural assessment prior to all works with the potential to impact on Aboriginal sites and places.	Ongoing
3.4.3	Encourage surveys and further research into the Aboriginal heritage values of the park with the Coonabarabran and Weilwan LALC, Burra Bee Dee / Coonabarabran Aboriginal Elders Group and the Gamilaraay Language Circle. Priority for surveys will be given to areas of high recreational use, areas of potential damage from management operations such as fire trail maintenance, and areas identified as being of high priority by local Aboriginal people.	Ongoing
3.4.4	Require commercial tour operators who propose to visit approved Aboriginal sites or places to engage a local Aboriginal Discovery guide for the activity.	Ongoing
3.4.5	Undertake conservation works in consultation with the local Aboriginal community to protect Aboriginal sites if any are being negatively impacted by visitors, feral animals or any other natural or artificial processes.	Medium
Historic Heritage		
3.5.1	Undertake an archaeological survey and cultural assessment prior to all works with the potential to impact on historic sites and places.	Medium
3.5.2	Maintain the Strathmore Homestead and shearer's quarters while protecting the integrity of the existing heritage fabric.	Medium
3.5.3	Maintain Balor Hut for visitor use in partnership with the Coonabarabran Bushwalking Club.	Ongoing
3.5.4	Maintain Pinchams Woolshed. Make alterations to allow for wheel-chair access and ensure compliance with relevant building safety codes.	Medium
3.5.5	Retain in situ the remains of the sawmill, the Tara Woolshed stumps, the monuments, and the dingo fence.	Medium
3.5.6	Record the mineshafts in the park, assess for public safety and undertake any necessary protection works.	Medium
3.5.7	Progressively record other historic places and values, assess their significance and develop appropriate management strategies.	Medium
Recreation and Education		
3.6.1	Implement the actions outlined in the Warrumbungle National Park Walking Track Strategy 2004, Precinct Plan 2002 and Interpretation Strategy 2004 and ensure these documents are reviewed and updated as required.	High

3.6.2	Promote use of the park for low-key nature based activities such as bushwalking, camping, cycling, photography, bird watching and nature study.	Ongoing
3.6.3	Promote park visitation out of peak seasons to increase overall visitation without impacting on park values or the visitor experience.	Ongoing
3.6.4	If necessary, introduce a booking system to limit numbers of campers in certain areas to prevent overcrowding and conflict between users, permit revegetation, and/or to protect fragile geological features or native species.	Ongoing
3.6.5	Close sections of camping areas and undertake rehabilitation works as necessary to protect the natural environment, in particular threatened species.	High
3.6.6	Investigate options and determine the feasibility of introducing a policy of visitors removing their own rubbish.	Medium
3.6.7	Monitor visitation and visitor use patterns within the park through surveys, vehicle and pedestrian counters on roads and walking tracks and regular park user fee compliance checks at camping areas and car parks.	Medium
3.6.8	Develop and implement a visitor impact monitoring system for the park to assess and monitor environmental impacts in camping areas and on walking tracks to enable decisions about site protection, and protection of significant species or communities.	Medium
3.6.9	Redevelop Blackman 2 to address erosion, protection of Aboriginal sites and protect the creek bank and riparian vegetation. Remove old power outlet infrastructure, remove campsites within 20 metres of Mopra Creek to create a vegetation buffer along the creek, improve the access road and formalise parking and camping areas.	High
3.6.10	Develop a key pick-up and fee collection system with the Visitor Centre and Tooraweenah businesses for vehicular access to Gunneemooroo camping area, which will remain a basic camping area with no new facilities provided.	High
3.6.11	Develop and implement a communications strategy to inform visitors of changed access requirements for Gunneemooroo including new or additional signage and amendments to the web site.	High
3.6.12	Gate the management trail which passes through the Gunneemooroo camping area just past the camping area to prevent public vehicle access beyond this point.	High
3.6.13	In conjunction with Gilgandra Shire Council, improve the safety of the Pinchams Woolshed vehicle entry point from the John Renshaw Parkway.	Medium
3.6.14	Develop and install interpretative signage at Pinchams Woolshed outlining the history and values of Pinchams Woolshed and identifying the Tara Cave track head.	Low
3.6.15	Options for providing better access to shower facilities for campers at Walaay and Blackman 3 will be explored. They include providing all weather access across Wambelong Creek to the amenity block or the provision of shower facilities at Camp Blackman 3. The most cost effective and practical option will be implemented	Low

3.6.16	Continue to allow walk-in pack camping at Balor Hut, Danu Camp, Dows Camp, Gales Bore, Hurleys Camp, Ogma Camp and Burbie Spring. Pack camping is also permitted at other sites within the park that are at least 500 metres from roads.	Ongoing
3.6.17	Develop 2-3 small tent sites alongside Balor Hut in order to alleviate soil erosion and improve camping facilities.	Medium
3.6.18	Continue to require walk-in pack campers to register at the Visitor Centre to provide information on numbers and location and to encourage appropriate behaviour. Limits will be placed on the size and number of groups seeking pack camping if necessary to reduce visitor impacts on pack camping sites.	Ongoing
3.6.19	Provide minimal impact camping information at the Visitor Centre and at walk-in pack camp sites. This will include information that no wood fires are permitted at pack camp sites and fuel stoves must be used for cooking.	Medium
3.6.20	Permit wood fires only within barbecues or communal fire places provided in camping areas. Additional gas cooking facilities may be installed to further reduce the impact of wood fires.	Ongoing
3.6.21	Maintain and upgrade walking tracks to the standards listed in Table 2 (section 3.6.4) in accordance with the Warrumbungle National Park Walking Track Strategy.	Ongoing
3.6.22	Review and upgrade directional signage on walking tracks.	High
3.6.23	Permit horse riding by consent on Namen and Yootha management trails (see map 1), consistent with the NPWS Horse Riding Policy and subject to the conditions of consent and monitoring of environmental impacts.	Ongoing
3.6.24	Allow cycling on roads and management trails.	Ongoing
3.6.25	Continue to prohibit rock climbing on the Breadknife, and on Chalkers Mountain, Square Top Mountain and Black Jack Mountain to prevent disturbance to rock wallabies. Rock climbing is generally permitted on all other peaks within the park, although temporary seasonal closures or other restrictions on times and numbers of climbers may be imposed if necessary. Marking or bolting of climbing routes is prohibited. Climbers are encouraged to register at the Visitor Centre.	Ongoing
3.6.26	Extend the current barbecue shelters at Canyon Picnic Area to provide additional shelter for picnic tables.	Medium
3.6.27	Continue to permit an annual concert in the park. Limit attendance at the concert to 2000 people. Install an electricity transformer and underground cabling at the concert site if a cost/benefit analysis indicates it is feasible.	Ongoing
3.6.28	Improve interpretation in the park by improving signs and providing a range of education and interpretation programs in accordance with the park interpretation plan.	Medium
3.6.29	Continue to promote face-to-face interpretation through the Discovery program. Ensure the program is run at a level that is meeting demand and encourage the use of Aboriginal Discovery staff where appropriate.	High

3.6.30	Encourage use of the park for environmental education purposes. The activities of the Warrumbungle Environmental Education Centre will be promoted through the Visitor Centre and where appropriate in visitor information material.	Ongoing
3.6.31	Develop a written agreement with the Department of Education and Training outlining the partnership and site use conditions with the Warrumbungle Environmental Education Centre.	High
Weeds and Pest Animals		
4.1.1	Control introduced species in accordance with the Northern Plains Regional Pest Management Strategy.	High
4.1.2	Monitor noxious and significant environmental weeds. Treat any new outbreaks where possible.	High
4.1.3	Implement the Fox TAP in the park to reduce their impact on the brush-tailed rock-wallaby population. Undertake control where possible in cooperation with the Central North Livestock Health and Pest Authority, Landcare and the Namoi and Central West CMAs.	High
4.1.4	Continue to seek the cooperation of neighbours in implementing weed and pest control programs.	Ongoing
4.1.5	Ensure stock are removed from the park as soon as possible.	High
4.1.6	Assess existing boundary fencing and where required provide assistance under the terms of the NPWS boundary fencing policy to ensure effective fencing is in place.	Medium
Fire		
4.2.1	Implement the Warrumbungle National Park Fire Management Strategy. Regularly review and update the strategy.	High
4.2.2	Continue to participate in the Castlereagh and North West Bush Fire Management Committees. Maintain cooperative arrangements with local Rural Fire Service brigades and fire control officers, and other fire authorities, the Siding Spring Observatory and surrounding landowners in regard to fuel management and fire suppression	High
4.2.3	Manage fire in the park to protect assets and biodiversity in accordance with the fire regimes/thresholds identified in the fire management strategy.	High
Climate Change		
4.3.1	Continue existing fire, pest and weed management programs to increase the park's ability to cope with future disturbances, including climate change.	Ongoing
Management Operations and Other Uses		
5.1	Develop a tree lot to use excess grey water from the waste water treatment ponds in accordance with regulations.	High
5.2	All new toilet facilities will be composting toilets where practical.	Ongoing
5.3	Where feasible, install solar power and rainwater tanks to buildings.	Ongoing
5.4	Investigate options and implement recommendations for upgrading or replacing the Camp Blackman amenity block.	Medium

REFERENCES

Benson, J.S., Richards, P., Waller, S. & Allen, C. (2010) 'New South Wales Vegetation Classification and Assessment: Part 3 Plant communities in the Brigalow Belt South, Nandewar and western New England Bioregions: Version 3 of the NSWVCA database'. *Cunninghamia 11(4) 457-579*.

Briggs, J.D. & Leigh, J.H. (1996), *Rare or Threatened Australian Plants Revised edition*, CSIRO, Melbourne

Commonwealth of Australia 2006, *Commonwealth of Australia Gazette Special Issue No. S 227, 15 December 2006 Environmental and Biodiversity Conservation Act – inclusion of a place in the National Heritage List,* http://www.ag.gov.au/portal/govgazonline.nsf/0F6CE55A5EB5466ECA25724500062850/$file/S227.pdf , accessed 28 March 2011

Commonwealth of Australia 2000, *Environmental Protection and Biodiversity Conservation Regulations 2000 – Schedule 5B,* http://www.austlii.edu.au/au/legis/cth/consol_reg/epabcr2000697/sch5b.html, accessed 28 May 2011

DECC (2007), *Northern Plains Region Pest Management Strategy 2008-2011,* NPWS, http://www.environment.nsw.gov.au/resources/pestsweeds/09105NorthernPlainsRegionPestMgmtStrategy.pdf,accessed 28 March 2011

DECC (2009), *Site Management Plan, Square Top Mountain Brush-tailed Rock-wallaby Translocation and Monitoring Project: Pulling Rock-wallabies from an Extinction Vortex*, DECC Hurstville, unpublished report

Hunter, J.T (2008), *Vegetation and Floristics of Warrumbungle National Park - a report to the New South Wales National Parks and Wildlife Service*, unpublished report

Moss G.L (2000), *The Influence of eastern grey kangaroo (Macropus gigantus) grazing on vegetation in Warrumbungle National Park*, Ecosystem Management, University of New England, Armidale, NSW

NPWS (2001), *Warrumbungle National Park Fire Management Plan 2001-2006,* NPWS Northern Plains Region http://www.environment.nsw.gov.au/resources/firemanagement/final/WarrumbungleFMS2001.pdf , accessed 28 March 2011

NPWS (2002a), *Targeted Flora Survey and Mapping. NSW WESTERN REGIONAL ASSESSMENTS BRIGALOW BELT SOUTH BIOREGION (STAGE 2) A project undertaken for the Resource and Conservation Assessment Council NSW Western Regional Assessments project number WRA / 16*, http://www.racac.nsw.gov.au/pdf/wra16.pdf , accessed 28 March 2011.

NPWS (2002b), *Precinct Plan Warrumbungle National Park 2002-2012*, New South Wales National Parks and Wildlife Service Northern Plains Region, Unpublished report.

NPWS (2003), *Walking Track Strategy Warrumbungle National Park 2003-2013,* New South Wales National Parks and Wildlife Service Northern Plains Region, Unpublished report.

NPWS (2004), *Interpretation Plan Warrumbungle National Park 2004-2014,* New South Wales National Parks and Wildlife Service Northern Plains Region, Unpublished report.

Porteners, M (2003), Revegetation Strategy Warrumbungle National Park. Unpublished report for the New South Wale National Parks and Wildlife Service.

Whitehead, J (2008), *The Warrumbungles Dead Volcanoes - National Park, Telescopes and Scrub,* John Whitehead, self published, Coonabarabran, New South Wales.