

*Just look up*

# RIVER MURRAY DARK SKY RESERVE SOUTH AUSTRALIA

ANNUAL REPORT to  
THE INTERNATIONAL DARK SKY ASSOCIATION

Presented by  
Mid Murray Landcare SA

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## **River Murray International Dark Sky Reserve - Annual Report 2020**

The project to create a Dark Sky Reserve in the Murraylands Region of South Australia was initiated by Mid Murray Landcare SA in August 2016. Working in close collaboration with the Mid Murray Council, Mid Murray Landcare SA set up a Dark Sky sub-committee consisting of local residents, astronomers, scientists and Council staff. This team ran community education events, collected all the relevant data, created policy documents, and prepared the application.

The River Murray International Dark Sky Reserve was officially approved by the IDA board in October 2019. The announcement was made public at an event at Big Bend on the River Murray in mid November 2019.

Efforts to promote and capitalise on the River Murray International Dark Sky Reserve since its formal accreditation have delivered opportunities for further investment, tourism growth and scientific interest in the area, as well as worldwide media attention.

A community event to celebrate the approval was held at Meldanda in late November 2019, attended by the Mayor of Mid Murray, South Australia's Minister for Tourism, local Members of Parliament, astronomers, local residents, tour operators and government representatives.

The launch received national media coverage in more than 70 media outlets, reaching an estimated 17 million people in Australia and worldwide. Media included: ABC National (TV, radio, online), The Advertiser, The Guardian, The Australian, Channel 7, Channel 10, Channel 9, Daily Telegraph, Broadsheet, The Lead, Cairns Post, Sight Magazine, MSN, GlamAdelaide, Stock Journal and many more. This media coverage has been estimated to be worth well over \$1 million.

The ABC's Behind the News story on the Dark Sky Reserve and the impact of light pollution aired in September 2020 (<https://www.abc.net.au/btn/classroom/dark-sky-sanctuary/12553562>) reached another 1 to 2 million school age viewers.

### **- Coronavirus Impact**

The Coronavirus pandemic had a sudden and direct impact on our efforts to develop the Reserve and take advantage of the momentum and interest generated by the Reserve's launch. The first cases of the virus appeared in Australia in mid-January. The federal government immediately introduced compulsory two (2) week quarantine for anyone coming from infected areas, while any locals found to be infected were required to self-isolate for two (2) weeks. Thorough contact tracing was used for all recent arrivals who tested positive.

Interstate and international flights were cancelled and Australia's borders were closed, meaning international tourism ceased overnight. The Government ordered the closure of large venues such as stadiums, theatres, cinemas, churches, restaurants, cafes, and bars. Major sporting and arts events were cancelled and schools and universities were closed. Businesses that were not regarded as essential were required to close or work from home. Gatherings of more than 10 people were banned. This was soon reduced to groups of five. The use of hand sanitiser and face masks was encouraged, while social distancing was enforced in shops and supermarkets.

Australia's internal state borders were also closed and travel inside South Australia was limited to essential travel, such as for food shopping, doctor's appointments or work, only. Public compliance with these measures was exceptional.

South Australia's borders remained closed until the end of September 2020 and international travel has still not resumed. As a result of this rapid response, community testing, contact tracing and strict

enforcement of quarantine South Australia, with a population of 2.7 million people, has had a total of just 468 cases of Covid-19 and only 4 deaths.

All of this had a massive impact on our activities. Regional communities effectively closed across the Reserve. Face to face meetings were not possible and community dark sky events were not allowed. All planned Dark Sky tourism, such as the first Dark Sky Cruise on the 100 year old paddle steamer, PS Marion in March, had to be cancelled and tour operators closed their doors for five months.

However, we used the time to plan facilities and prepare information for future visitors, as well as working on long term plans for the Reserve.

#### **- Ongoing Darkness Measurement**

A permanent SQM has been taking darkness readings at Meldanda near the Reserve's western boundary since 2017. A second permanent SQM was donated to the Reserve by committee member, David Bennett, and installed at Sunnydale in the east of Reserve in June 2020. This will provide useful comparison data and help record any changes in darkness readings more broadly across the Reserve.

Using the all sky digital camera method, readings taken at our core site in May 2019, Swan Reach Conservation Park, recorded 21.89 at the Zenith with the Milky Way in the Field of View, while for much of the night other areas of the sky recorded over 22 somewhere in the sky above 45 degrees.

This will be used as a baseline for any future measurements at our core site and assist in detecting any changes at our core site.

We will continue to take regular readings at our core site using both SQM and all sky measurements.

A permanent SQM has also been set up in Pooraka, a suburb in Adelaide's metropolitan area that has now accumulated 2 years of SQM data. Also an all all-sky camera is in the process of being set up at UniSA Mawson Lakes. These will provide comparisons between our reserve and suburban locations.

#### **- Website Development and Fact Sheet**

Despite the travel restrictions, interest in our Reserve has been strong and requests for information on tours and accommodation and best locations to see the stars have grown as restrictions are gradually lifted.

Mid Murray Landcare SA has developed a website and Facebook page for the Reserve, detailing its origins and the importance of reducing light pollution, the need to preserve darkness and teaching people about the stars.

Mid Murray Council has also added a Dark Sky Reserve page to its own website, providing information on Dark Sky [policies](#) and tourism.

A River Murray International Dark Sky Reserve Fact Sheet has been produced by Murray River Lakes & Coorong Tourism Alliance with assistance from Mid Murray Landcare SA. It is available for download and distributed to State Visitor Information Centre offices. Demand for the Fact Sheet has been strong.

Information on Dark Sky tours and astro-photography, and top places to see the stars has also been added to the Murray River Lakes & Coorong tourism website <https://www.themurrayriver.com/play-pause/Our-Night-Skies/>

Publicity generated through the launch last November has created a gallery of more than 50 professional photographs and videos, and the licensing to use these to promote the Reserve. This is valued at roughly \$25,000 in images and media content for future use in promoting the Reserve, as well as \$5,000 invested by Mid Murray Council and \$5,000 invested by Murray River Lakes & Coorong on the launch event itself.

#### **- Management Committee**

In recognition of the different skills required for preparing the application and making the Reserve a reality, we have sought to expand the skills of the Reserve's Management Committee by adding to our expert astronomers, tourism expertise, specialist educators, wildlife researchers, indigenous leaders, council staff, as well as the owners of our core site, the Department for Environment and Water.

The role of the Management Committee is to ensure the goals laid out in the Dark Sky Reserve application are met, provide annual updates to the IDA, continue on-going darkness monitoring of the Reserve, develop initiatives to promote awareness of light pollution and provide information and expertise to the community to reduce light pollution inside the Reserve and South Australia in general. To advise the Mid Murray Council on Dark Sky matters and issues as they arise, and to monitor compliance with the Light Management Plan and Dark Sky Lighting Policy.

In coming months, the Management Committee will develop a business plan for the Reserve, looking at sources of income, possible facilities such as an observatory and planetarium.

In 2020 Mid Murray Council updated its Strategic Plan to make the Reserve a top priority in its future planning. In addition to this, the Australian Government awarded the Mid Murray Council a \$20,000 grant to develop an astro tourism strategy for the Reserve and the whole district in order to create new events and tourism attractions/experiences that incorporate the Reserve and the night sky. This will generate both significant investment and economic benefit for the district, as well as increased awareness of the Reserve and its environmental and scientific significance.

#### **- SA Power Networks**

In line with its Light Management Plan, Mid Murray Council has confirmed with SA Power Networks (who manage street lighting) and the Dept. of Transport (who manage the river ferries) that it requires all new street and ferry lighting inside the Reserve will be Dark Sky compliant. It is proposed that all street lights be replaced over the next 5 to 10 years. However, this program has been put on hold during the pandemic as it was not regarded as 'essential'. As the state returns to 'Covid-normal', this replacement program will begin.

#### **- Proposed Dark Sky Unit**

As outlined in our application, we use two types of darkness measurement; standard SQM readings and calibrated all sky digital camera images converted to all sky SQM readings using Prof. Zoltan Kollath's Dicalum software.

The standard SQM readings are known to be unreliable in the darkest locations, as well as being impossible to verify. We prefer the all sky images which have the added advantage of visually confirming a clear sky at the time the readings were taken.

The issue of light from the Milky Way, as well as airglow, raises questions about the value of the SQM scale in exceptionally dark places such as our Reserve.

As a result, our committee member Andrew Cool, contributed to the paper 'Introducing the "Dark Sky Unit" for multi-spectral measurement of the night sky quality with commercial digital cameras'

published in the Journal of Quantitative Spectroscopy and Radiative Transfer (June 2020, Zoltan Kollath et al) proposing a new Dark Sky Unit in an effort to improve consistency in darkness measurement.

#### **- Telescope Pads**

Early in 2020 the Mid Murray Council received a \$50,000 grant for the installation of telescope pads inside the Reserve. The Council consulted closely with our expert astronomers to decide the best locations for up to 10 telescope pads.

The pads are to be built on community owned land to ensure they are easily accessible to the general public. The pads will come with Dark Sky signage and information about the Reserve. The pads will be located at Towitta Park, Blanchetown, Bow Hill, Big Bend, Shell Hill and Black Hill.

Maps showing their locations will be available online and at tourist information centres across the region. Tenders have been called for and construction will begin before the end of 2020. Other pads will follow at our core site, Swan Reach Conservation Park, our education site at Meldanda and other locations around the Reserve.

#### **- Dark Sky Tourism**

Commercially run Dark Sky tours began operating soon after the accreditation announcement. Local tour companies such as Juggle House Experiences, Mannum Dock Museum, Murray Princess and Big Bend by Night began offering night time tours around the region, combining river and wildlife experiences with telescope 'guided tours' and talks by astronomers, members of the indigenous community and our Management Committee.

Several tours took place in late 2019 and early 2020, and the Mannum Dock Museum also announced two Dark Sky cruising tours on the 120 year old paddle steamer the PS Marion to begin in 2020. These were to include guest speakers and astronomers on board to talk to passengers.

Interest in these tours was strong, but unfortunately all of these events had to be cancelled due to the coronavirus.

After almost seven months, restrictions have relaxed and South Australian residents are again allowed to travel inside the state. Interest in astro-photography tours and workshops has increased markedly. Such tours happened once or twice a year prior to the launch of the Reserve. Now, between 15 and 25 photographers (on average) travel to the region each month just to photograph the night sky with David Hartley's Astro Photography Tours. This increases during the Milky Way viewing seasons, and we believe will increase significantly when COVID-19 border restrictions lift.

These photographers regularly share their images on digital news platforms, social media and in specialist astro-photography social media groups, further spreading word within this growing sector about the Reserve and its potential.

#### **- The First Commercial Space Facility Inside the Reserve**

The River Murray International Dark Sky Reserve is not only incredibly dark, but also has very few radio sources, which makes the region almost totally free of radio interference. The first commercial space facility to take advantage of this almost total radio silence has been announced, with the construction of a multi-million-dollar passive radio wave detection project to be built near Swan Reach, with construction to begin before the end of 2020. This facility is a joint venture between Silentium Defence and the Western Sydney University and aims to better monitor the thousands of objects orbiting around Earth.

We anticipate that this is the first of many commercial space facilities for the Reserve, which will bring construction jobs to the region, as well as permanent staff to monitor the station. Permanent facilities like these also bring permanent residents to the region, boosting spending in local townships, communities and schools.

#### **- Proposed Observatory and Planetarium**

The Reserve's Management Committee is keen to provide a valuable experience to visitors. Modern telescopes allow inexperienced and even disabled people to see galaxies and other stellar objects in ways that were once impossible.

Along with several telescopes donated to Mid Murray Landcare SA, we aim to give local schools access to these instruments to improve their engagement with science and STEM studies.

The committee is also aware that the weather can sometimes prevent visitors seeing the stars. To avoid disappointment for visitors who may have travelled from interstate or overseas to experience our Reserve if the weather is cloudy or inclement, we aim to build a planetarium to provide at least some experience of our skies. This would be a first in regional South Australia.

The potential of the planetarium concept was demonstrated to senior tourism executives at the Adelaide Planetarium in August 2020.

Concept drawings for a combined Observatory and Planetarium are being prepared free of charge by one of Adelaide's most respected architects, Graham Hardy.

#### **- Tourist Signage**

Signs indicating the boundaries of the new Reserve and important viewing locations will be an important part of drawing people to the region. Murray River Lakes & Coorong Tourism Alliance is a collaboration between local councils and tour operators to promote the region. The Dark Sky Reserve is a key priority for this group, who received a \$20,000 grant for Dark Sky Reserve signage to key locations across the region.

#### **- Community and Schools Engagement**

Community interest in the Reserve has been strong and members of our committee have spoken to community groups such as Rotary, Roonka Scout camp, Mannum Men's Shed, and Friends of Brookfield Conservation Park. The privately run Wombats SA has also begun to hold telescope viewing nights at its property Moorunde Wildlife Reserve, close to our core site.

In 2019 schools inside the Reserve took part in our light inventory as part of our application to the IDA. This year we are following up with each school to teach them about the impact of light pollution on native animals, and find ways to improve external lighting at each school. This project was delayed due to the virus, and only resumed in September 2020 and will continue through the fourth school term.

The Astronomical Society of South Australia (ASSA) began to hold public and member events inside the Reserve in 2018. ASSA member's nights are now an on-going feature of activities at Meldanda. The property is becoming well known as an exceptional location for astronomy and astro-photography. ASSA is also considering a possible move into Reserve of its main observatory.

As part of its on-going public education program the Adelaide Planetarium continues to raise awareness of light pollution with visitors. We have supplied all-night, all-sky movies of the Reserve sky for showing in the UniSA Planetarium, demonstrating our remarkably dark skies.

We have also had senior physics students from Adelaide-based Christian Brothers College do astro-imaging at Meldanda.

#### **- Government Support**

The decision by the federal government to base Australia's Space Agency, Mission Control Centre and Space Discovery Centre in Adelaide has drawn a range of space-centred businesses and space researchers to the State. A January 2020 report by KPMG reveals that in 2018-19 the Australian space industry had revenues of AUD \$5.1 billion, with 770 businesses employing 14,000 people. Many of those businesses have set up in Adelaide to take advantage of this State's space focus.

The Reserve's proximity to Adelaide, the remarkable darkness, along with a lack of radio interference makes the region an attractive location for space facilities usually found in far more remote locations.

Management committee members Professor Don Bursill and Chris Tugwell met with representatives of the Space Agency and the Space Discovery Centre with a view to create on-going links and opportunities for the Reserve.

Professor Bursill, the former Chief Scientist of South Australia, also met with the current Chief Scientist to discuss the Reserve and provide the Premier with advice on its potential.

The South Australian Government has been looking closely at projects that can quickly stimulate the economy when COVID-19 restrictions end. The State government's Department of Trade and Investment sees great potential in the Reserve and an alliance has been established profiling the River Murray International Dark Sky Reserve nationally and internationally to attract regional investment for things like suitable dark sky accommodation.

The Federal Tourism Minister, SA Premier, Environment Minister, local MPs, local Mayor, Tourism Australia PR Director and SA Tourism Commission are all now familiar with the Reserve, and are sharing details of it, or advocating for it when opportunities arise.

#### **- International Promotion**

In October 2019 our Chairman, Chris Tugwell, was invited to Taiwan to raise awareness of light pollution and speak about the River Murray International Dark Sky Reserve to community and school groups in Taichung and Tainan in southern Taiwan, and to hospitality and tourism students at the National Taitung University in eastern Taiwan. He also visited Taiwan's newly declared dark sky site, Hehuan Mountain International Dark Sky Park. Using the same calibrated SQM as used for readings in our Dark Sky Reserve, he took average readings of 21.4 on a clear moonless night at 2,750 metres above sea level. Nevertheless, he observed that light pollution is a massive problem in Taiwan and in the regions surrounding their Dark Sky Park.

#### **- Australasian Dark Sky Alliance (ADSA) Membership**

The Australasian Dark Sky Alliance (ADSA) is a national lobbying group covering New Zealand and Australia promoting the use of dark sky compliant lighting and raising awareness about light pollution.

Following our accreditation as an International Dark Sky Reserve we were offered complimentary membership of ADSA. In June 2020 we took part in ADSA's Citizen Science Project raising awareness of light pollution. Over 10,000 people participated in the effort to map Light Pollution around the globe. The activity resulted in a Guinness World Record for the MOST NUMBER OF PEOPLE PARTICIPATING IN AN ONLINE SUSTAINABILITY LESSON.

Also in mid 2020, ADSA released the 'Best Lighting Practice' brochure to raise awareness of suitable lighting while ADSA member and IDA board member, Dr Kellie Pendoley worked with the federal Department for Environment to establish 'National Light Pollution Guidelines for Wildlife' (January 2020) as a national standard.

#### **- SA Planning Act Progress**

Mid Murray Council has made efforts to have the River Murray International Dark Sky Reserve recognised as a special zone under the SA Planning Act. This would give it permanent legal protection.

The Council has decided to delay this effort until the Act is passed and a second round of inclusions is considered. They believe this will give it a better chance of success.

#### **- Assistance with Beltana Dark Sky Application**

Members of our committee have provided advice and support, and Andrew Cool has supplied all sky images and SQM readings, for a proposed Dark Sky place at Beltana in South Australia's Flinders Ranges. This proposal is still in its very early stages and we will continue to offer help wherever we can.

#### **- Development Applications**

Mid Murray Council has begun using its Dark Sky Lighting Policy for new developments inside the Reserve. So far this has included an application to install lights at a local tennis club and the redevelopment of a 24 hour petrol station inside the Reserve. While the service station application was received before the Reserve was declared, Council is working with the developer to ensure future lighting is dark sky compliant. However this highlights the fact that the Council policy is not legally enforceable, and further reinforces the importance of having the Reserve recognised in the South Australian Planning and Design Code so private developers are also subject to lighting requirements - as the Council has committed to with its public lighting.

This has been a challenging first year, but the committee has created a solid basis for future growth, and is committed to ensuring the Reserve meets its targets in the future.

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