

# The Otago Dark Skies Project

## Project Aim

The recognition, promotion and protection of Otago's unique dark sky resource.



The centre of the Milky Way above Queenstown and Frankton. The white LEDs of Five Mile contribute disproportionately to the sky glow. Credit: Home of South Photography.

## Who we are

Seven Otago Dark Sky groups: Dunedin, Moeraki, Naseby, Central Otago, Alexandra/Cromwell, Cardrona, and Glenorchy, coordinated by the Winterstellar Charitable trust, and linked to the national initiative via the Royal Astronomical Society of New Zealand (RASNZ) and the International Dark Sky Association (IDA).

## The Issue

**Globally**, the loss of dark skies at night is one of the biggest impacts on humanity wrought by environmental change since the industrial revolution. 80% of the world's population now live under light polluted skies at night. **Otago's** unique dark sky resource presents a significant opportunity to the region, however, it is also under threat. Development is the primary cause of night sky brightness increase. Queenstown has more than doubled its night sky brightness in 10 years and Cromwell has increased by 50%. White **LEDs** (3000 K and above) are a major factor, contributing 4 times more sky low than high pressure sodium lights. The IDA estimate over 30% of all outdoor light is "wasted". Scaling US numbers, outdoor lighting in New Zealand consumes approximately 1.8 TWh/year, corresponding to \$135 M in wasted energy each year.

Solutions are nevertheless straightforward and they provide major opportunities for the region. Dark skies are a win-win proposition for government and the community. Dark skies are particularly relevant in this post-COVID period as we collectively address challenges such as regenerative tourism, well-being and intergenerational equity.

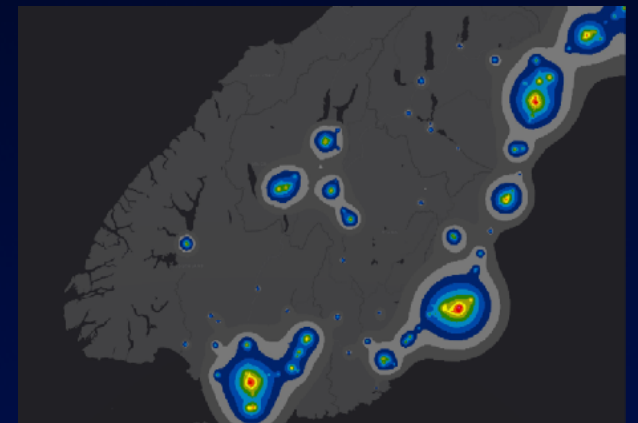
There has never been a better time to act.

## Otago is a special place

**Our sky** - Otago lies further south than 99.99% of the world's population; the Southern Milky Way rises higher/stays longer in the sky; and we see more Aurora Australis than further north.

**Our tourism** - More than other region, our extensive tourism development (e.g. bike tracks, wineries) provides an ideal platform from which to leverage new astronomy-related opportunities. **Our darkness** - 70% of Otago's skies currently meet the criteria for darkness required for the IDA's Dark Sky Park designation. **Our World Heritage** - A significant part of Otago lies within the recognised UNESCO World Heritage of Te Wahipounamu - South West New Zealand, and we have a responsibility to the world to care for it.

Otago councils are uniquely placed to play a leadership role in dark skies, reinforcing the power of localism which helps to anchor people to their love of this special place.



Night sky brightness map for Otago and surrounding regions. Credit: Falchi et al. Sci. Adv., Jacob Grothe/NPS, Matthew Price/CIRES.

## Benefits to the Region

**Dark skies** provide benefits to the community in all four key areas of well-being.

**Economic** - Every 1% increase in tourist numbers brings an additional \$30 m in revenue. Astro-tourism is aligned with regenerative tourism strategies and high-value slow tourism including overnight stays. Energy savings from a reduction in power bills. **Cultural** - The night sky is timeless and offers learnings from different cultural interpretations, including Matariki. **Social** - Dark skies play a pivotal role in supporting community cohesion under a common sky and as a shared gateway to awe and wonder. They stimulate the arts through astrophotography. **Environment** - Dark skies protect the circadian rhythm of humans, flora and fauna, and notably birds and insects. Reduced energy usage and lower carbon emissions. In addition, other benefits accrue in the areas of **Health** - where dark skies help maintain melatonin balance with well-documented health benefits and **Education** - with the dark sky an accessible laboratory for people of all ages to learn science from astronomy.



Matariki imaged with a DSLR/200 mm lens from Lake Hayes. Capturing the interstellar dust cloud in which Matariki is embedded is only possible in our dark skies. Credit: Brian Boyle.



Torquay Street, Kaikoura before with unshielded HPS lights (upper panel) and after with 2200 K LEDs operated at 25% (lower panel). Shielding would further improve the lighting. Credit: Larry Field.

## Things we can do

**Recognise** the valuable yet diminishing asset that we collectively hold in dark skies. **Promote** the benefits they bring to the region and its community.

**Advocate** to protect this asset. Solutions for existing lights can be minor and energy saving e.g. dimming existing lights, which also extends their lifetime, or switching off when not required. For new developments or replacements, good policies would include appropriate shielding and 2200 K (or less) LED lights. These solutions are win-win, saving energy due to reduction in wasted light, providing a better, safer lighting environment whilst minimising glare, discomfort and unwanted visual disturbances.

## How Can I Get Involved?

Adopt good lighting practices at home. Switch off outdoor lighting when not needed, via timers or other means. Use LEDs with colour temperature of 2200 K or below. Shield outdoor lighting to reduce light spill into the night sky.

Join, or even form your local dark sky group and help with submissions to councils on the broad benefits of a dark sky at night. Contact Winterstellar for further details.



Aurora Australis over Butcher's Dam, Alexandra. Credit: Andy Davey.

## Further Information

International Dark Sky Association: [www.darksky.com](http://www.darksky.com)  
Night sky brightness: <https://cires.colorado.edu/Artificial-light>  
Royal Astronomical Society of New Zealand [www.rasnz.org](http://www.rasnz.org)  
Winterstellar Charitable Trust [www.winterstellar.com](http://www.winterstellar.com)