

Protecting the Night

Dr Richard McDermid

ARC Future Fellow

MQ Physics and Astronomy Department



Image Credit: Angel Lopez-Sanchez



Rural location: 200 people

Credit: Jeremy Stanley



Urban location: 400,000 people

Credit: Jeremy Stanley



Credit: Barnaby Norris

Warrumbungle Dark Sky Park - Warrumbungle Dark Sky Park

www.warrumbungledarkskypark.org

Warrumbungle Dark Sky Park LATEST NEWS RESOURCES SUPPORTERS ABOUT THE REGION CONTACT

WARRUMBUNGLE NATIONAL PARK IS AUSTRALIA'S FIRST DARK SKY PARK!

Warrumbungle National Park in Central Western NSW has been declared Australia's first Dark Sky Park, recognising and protecting its key role in astronomical research.

Planning Minister Rob Stokes and Environment Minister Mark Speakman welcomed the park's new status, following confirmation from the International Dark Sky Association.

Mr Stokes said the park's dark sky qualities will be protected with \$100,000 in funding to control light pollution through implementation of updated planning policies. A new Dark Sky Planning Guideline has also been developed with the Australian Astronomical Observatory as part of the NSW Government's review of state planning policies.

"Warrumbungle National Park has long been recognised not only for its beauty at ground level, but also for the wonder it holds in the night sky above," Mr Stokes said.

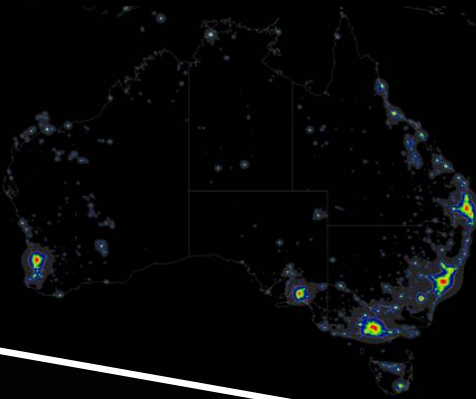
"It's an outstanding place to view the night sky and, with the nearby Siding Spring Observatory, plays an important role in Australian astronomical research."

<http://www.warrumbungledarkskypark.org>

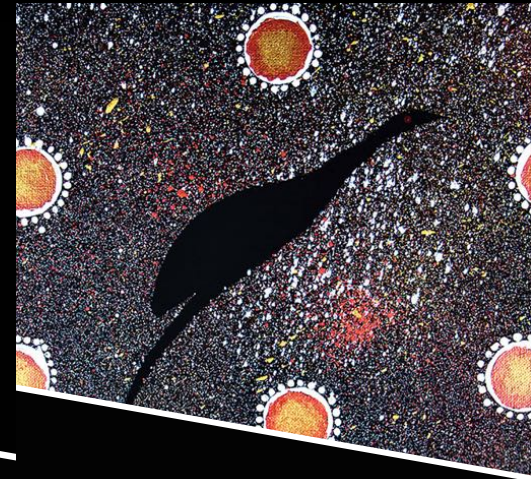
WARRUMBUNGLE NATIONAL PARK
IS AUSTRALIA'S FIRST DARK SKY PARK!



LIGHT POLLUTION
THREATENS WILDLIFE



LIGHT POLLUTION
WASTES ENERGY AND MONEY



THE NIGHT SKY
IS PART OF OUR COMMON HERITAGE



@darkskyaus

| www.warrumbungledarkskypark.org

Macquarie Astronomy Student Project

THE WARRUMBUNGLES DARK SKY PARK PROJECT

Introduction

Why You Should Care

Light Pollution

Doing Your Part

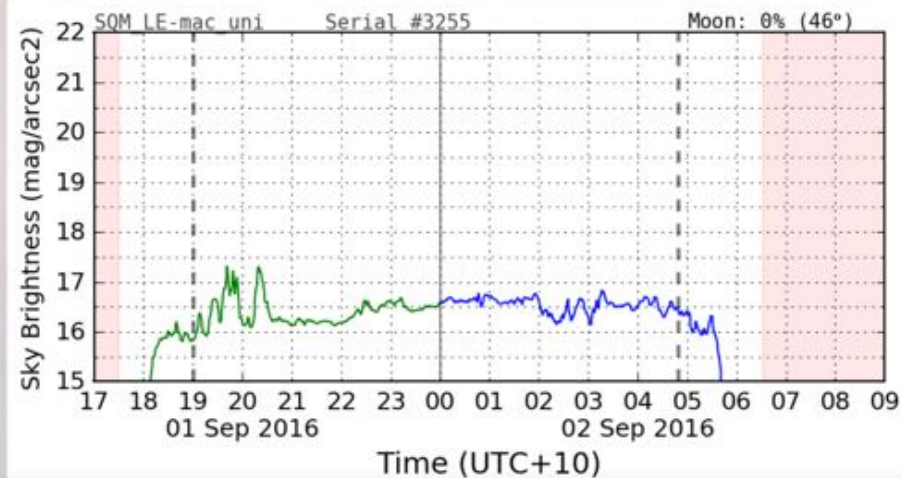
About the Authors

About the Authors



This photo was taken at the Parkes Radio Telescope on the 29th of September 2016. Here Tash and Mikaela took a tour with the rest of the

Sky Quality at Macquarie University Observatory



<http://web.science.mq.edu.au/~sqm/>





Macquarie University Campus Observatory



Image Credit: Adam Joyce

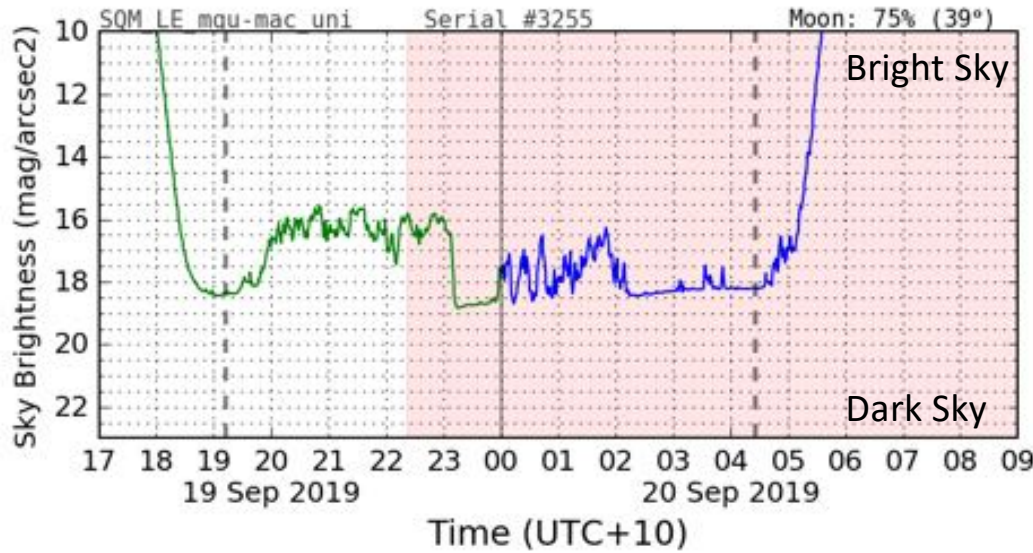
Same sky, Warrumbungles Dark Sky Park



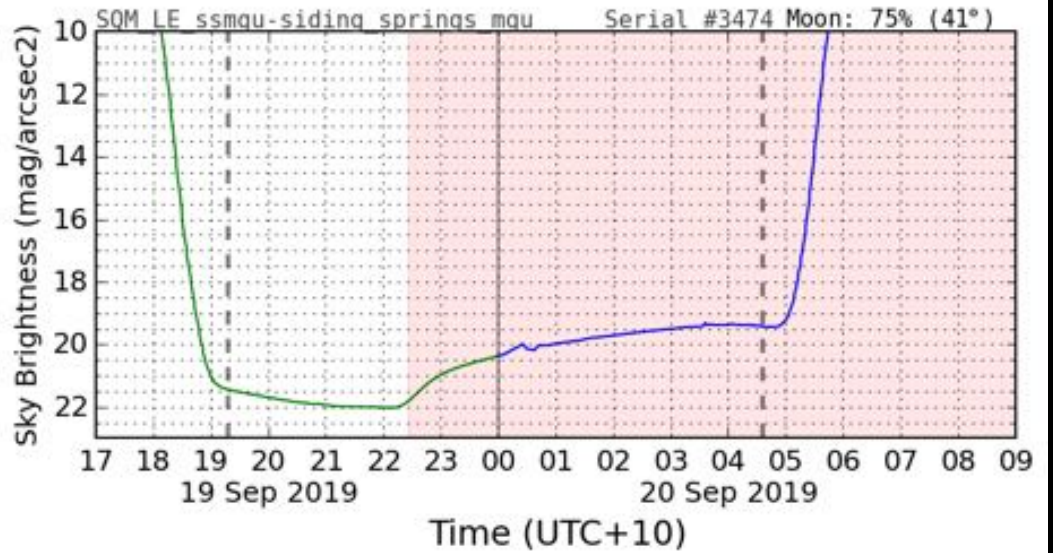
Image Credit: Adam Joyce



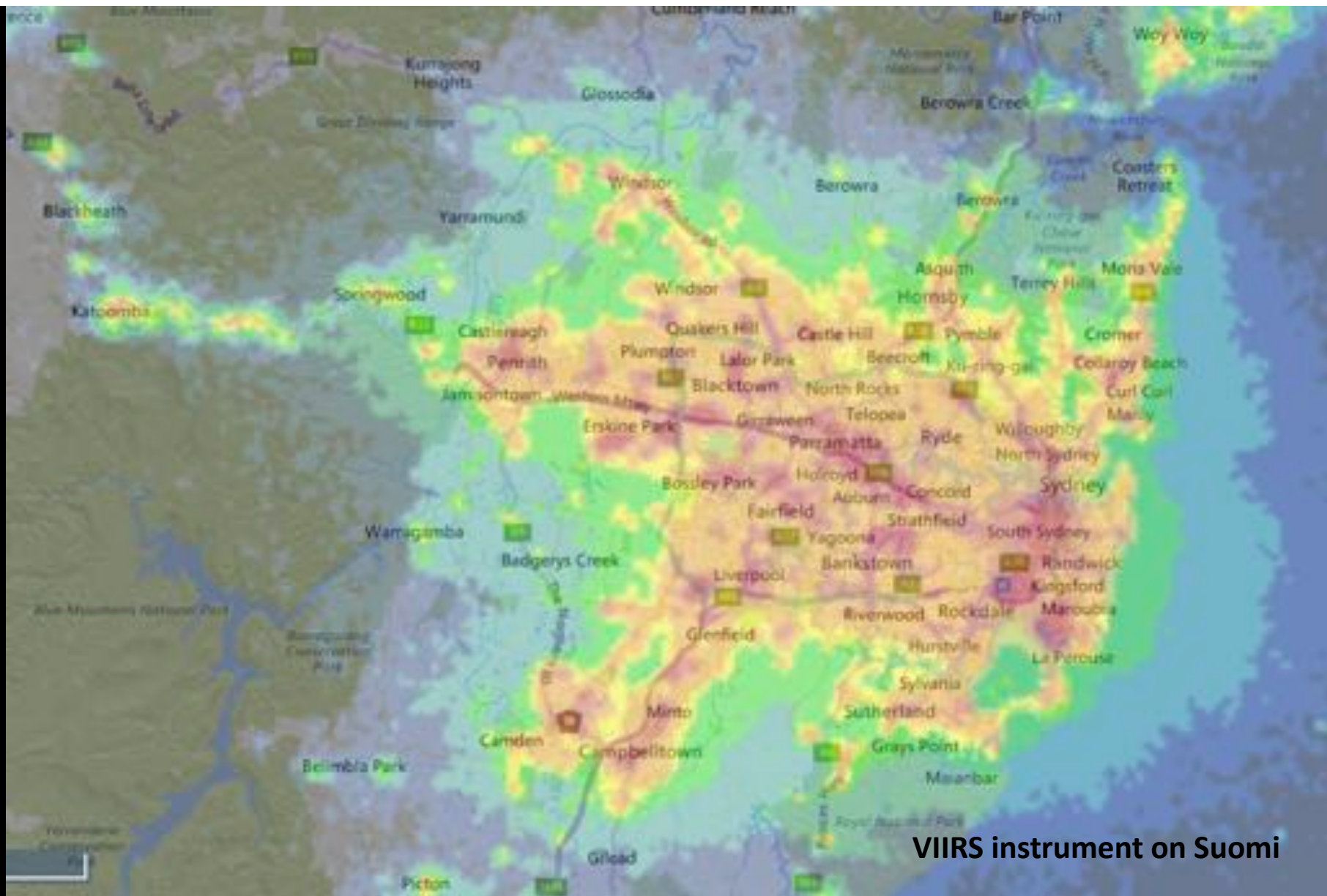
Last Night's Data



Macquarie Campus

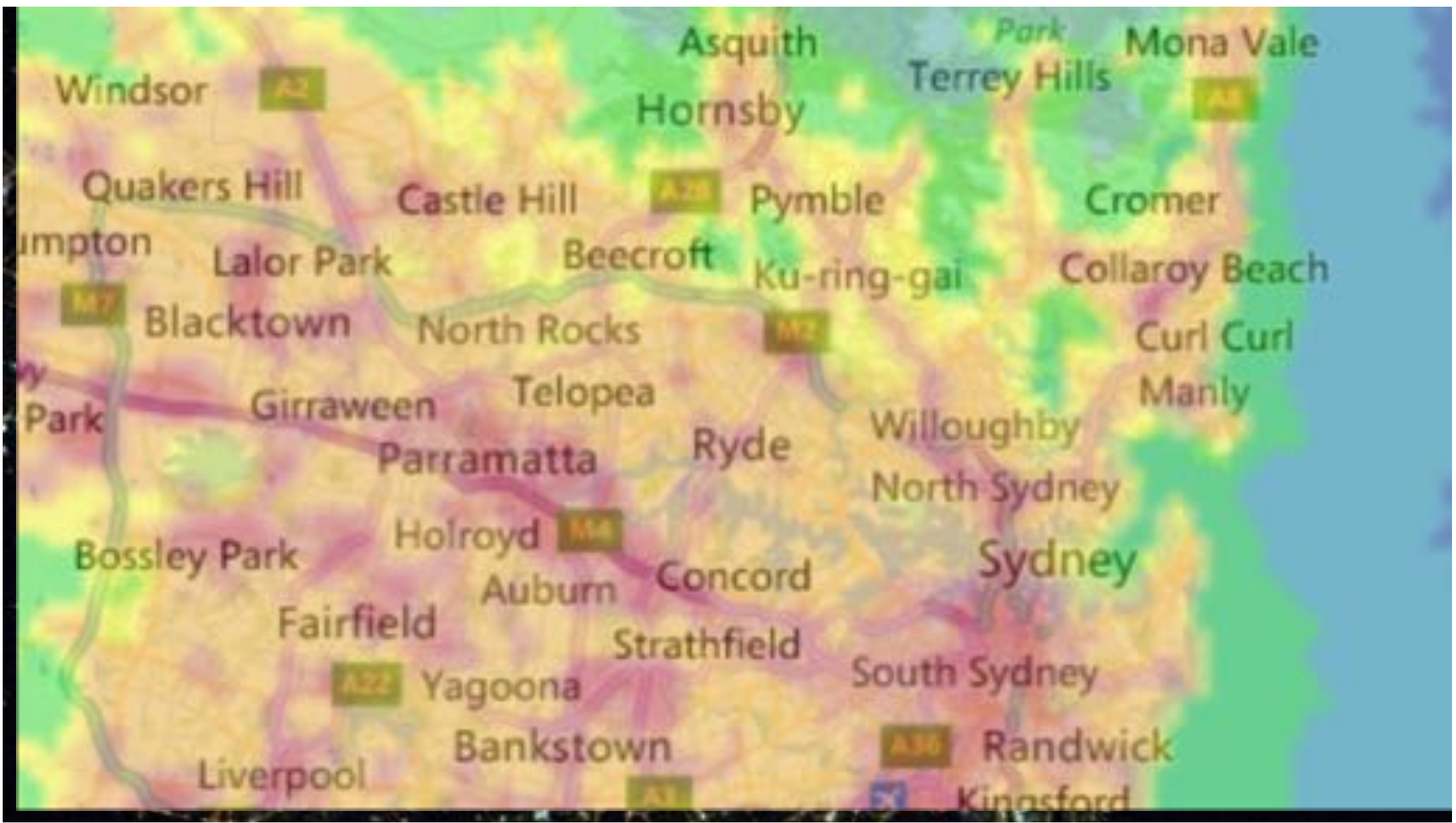


Warrumbungles Dark Sky Park

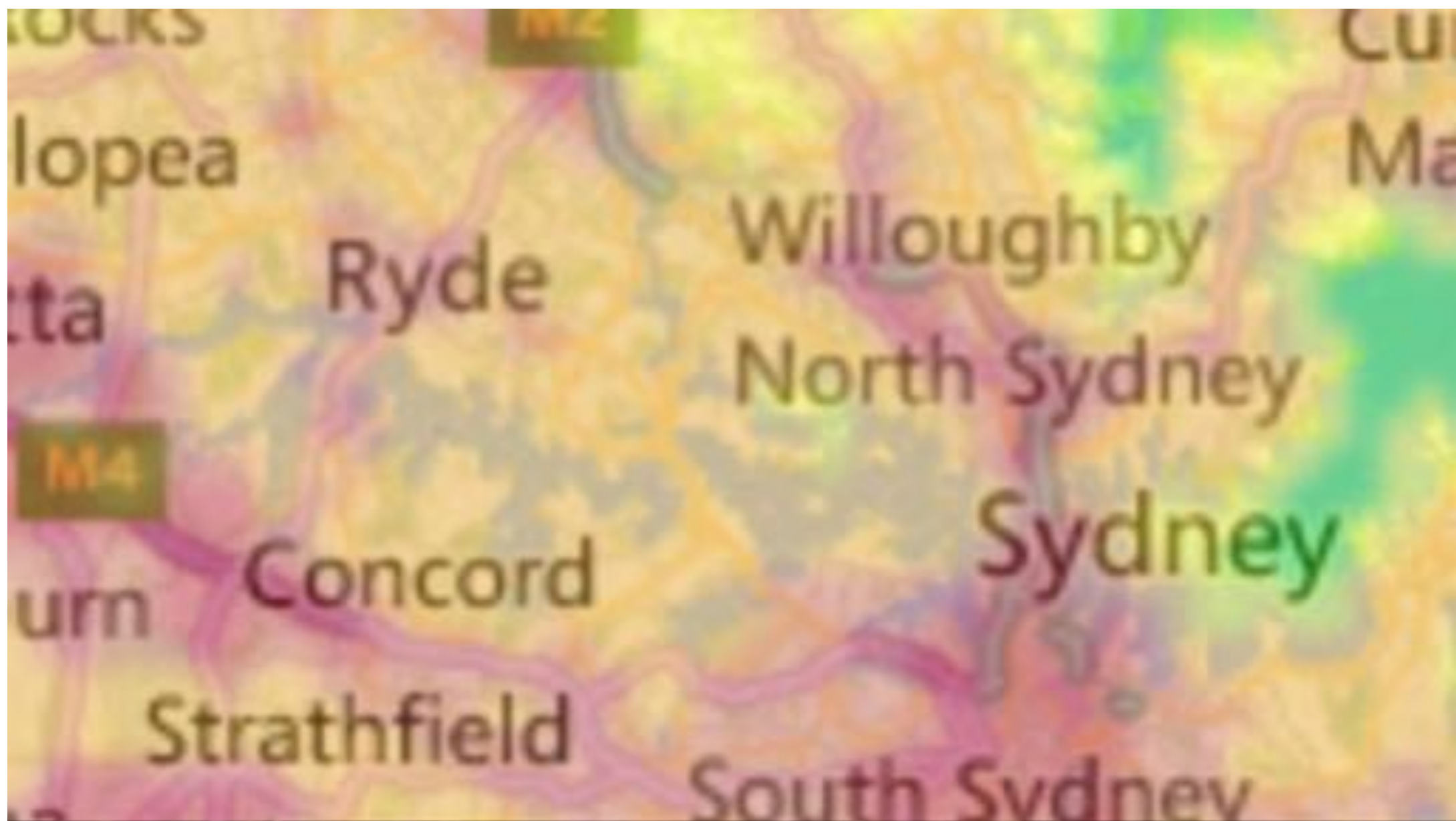


VIIRS instrument on Suomi











Diffuse Sky Background Light

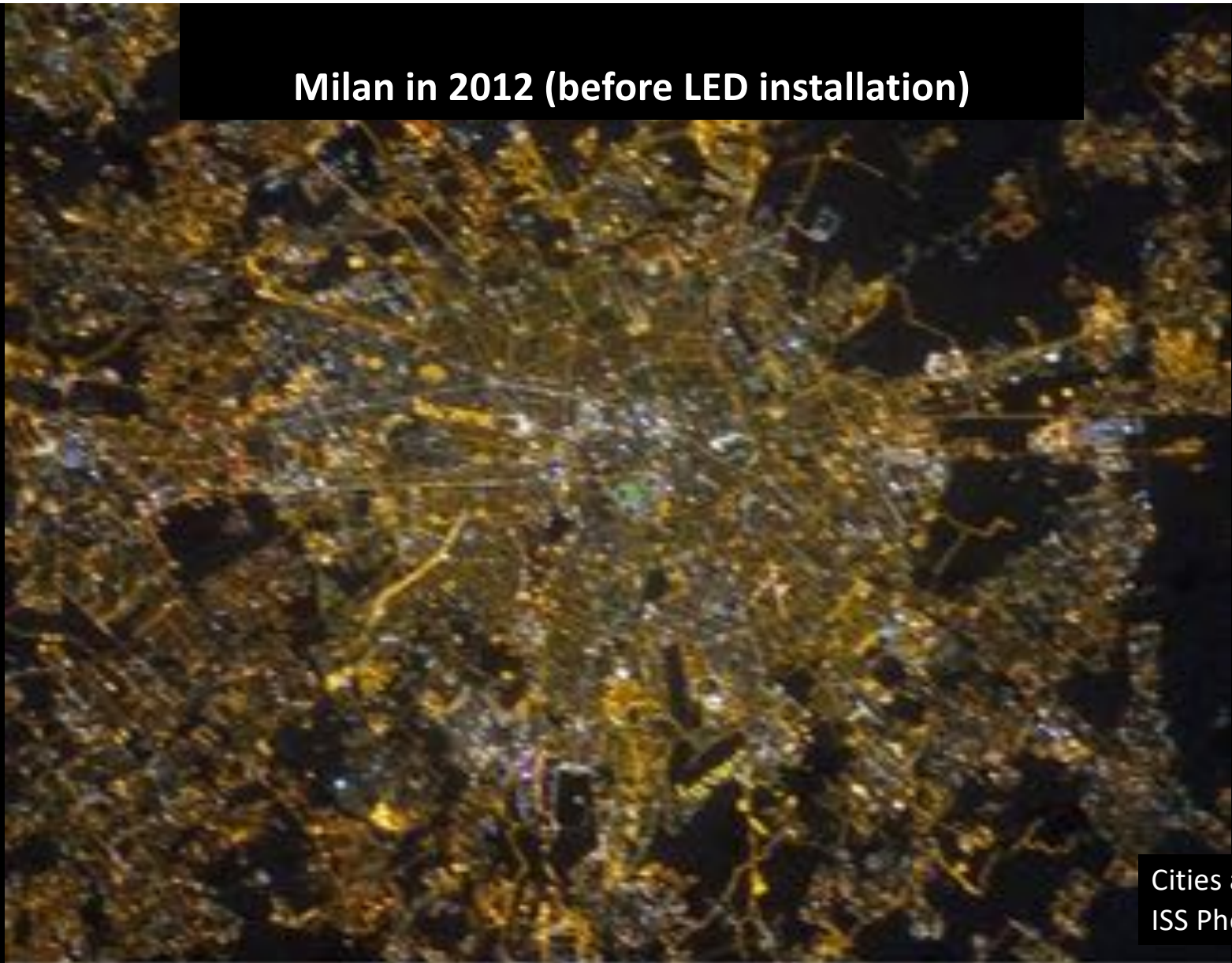
- Night sky brightness is very de-localized
 - Variations on >1km spatial scales
- Origin of light is highly localized
 - Main sources are arterial roads and commercial districts
- Means that meaningful reduction and/or protection requires controls over large areas and multiple stakeholders/councils
- What about colour and time axes?

Shift to LEDs

- Conversion to LEDs from High-Pressure Sodium is now common
- LEDs are more energy efficient, and lower maintenance
- But typically rich in blue light
- Blue light scatters more efficiently, and has potential impacts on human health and ecology



Milan in 2012 (before LED installation)



Cities at night project
ISS Photographs

Milan in 2015 (after LED installation)



Cities at night project
ISS Photographs

Bendigo before LED installation



Bendigo after LED installation

Maybe better for star-gazers, but that light is still going down....



Australian Government

Department of the Environment and Energy

DRAFT Light Pollution Guidelines

National Light Pollution Guidelines for Wildlife

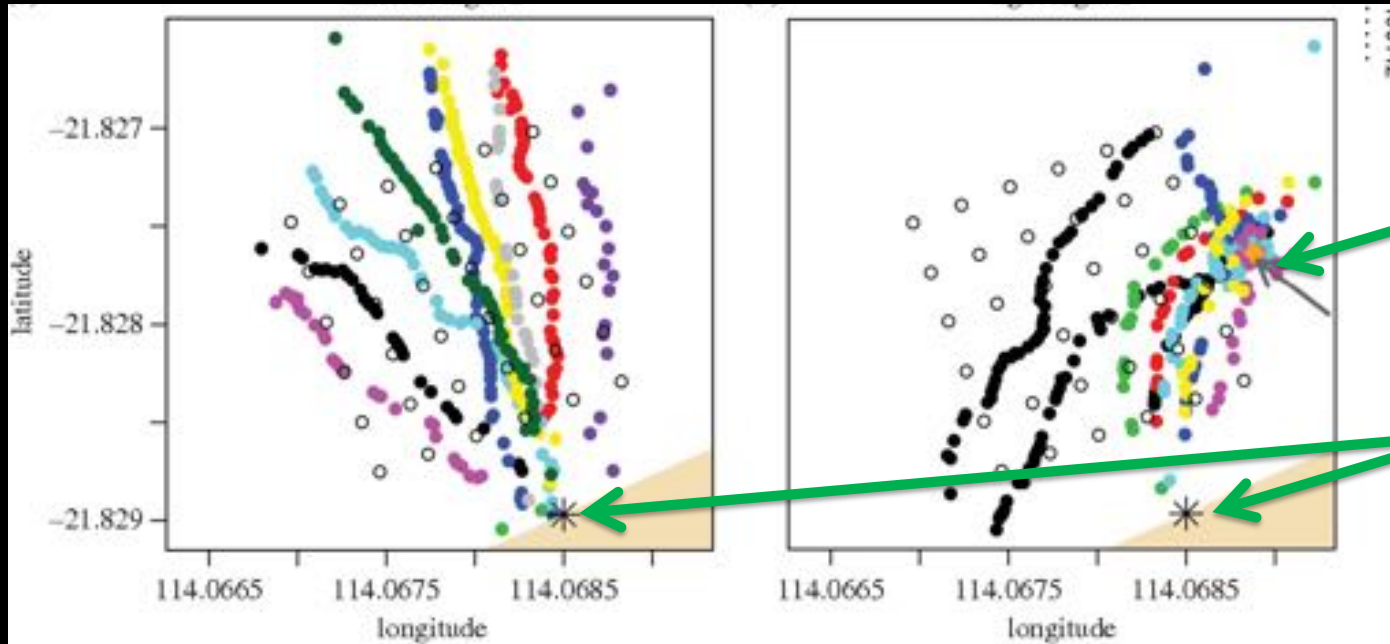
*Including marine turtles, seabirds and migratory
shorebirds*

September 2019

Released for consultation, September 2019: <https://www.environment.gov.au>

Ambient light

With artificial light source

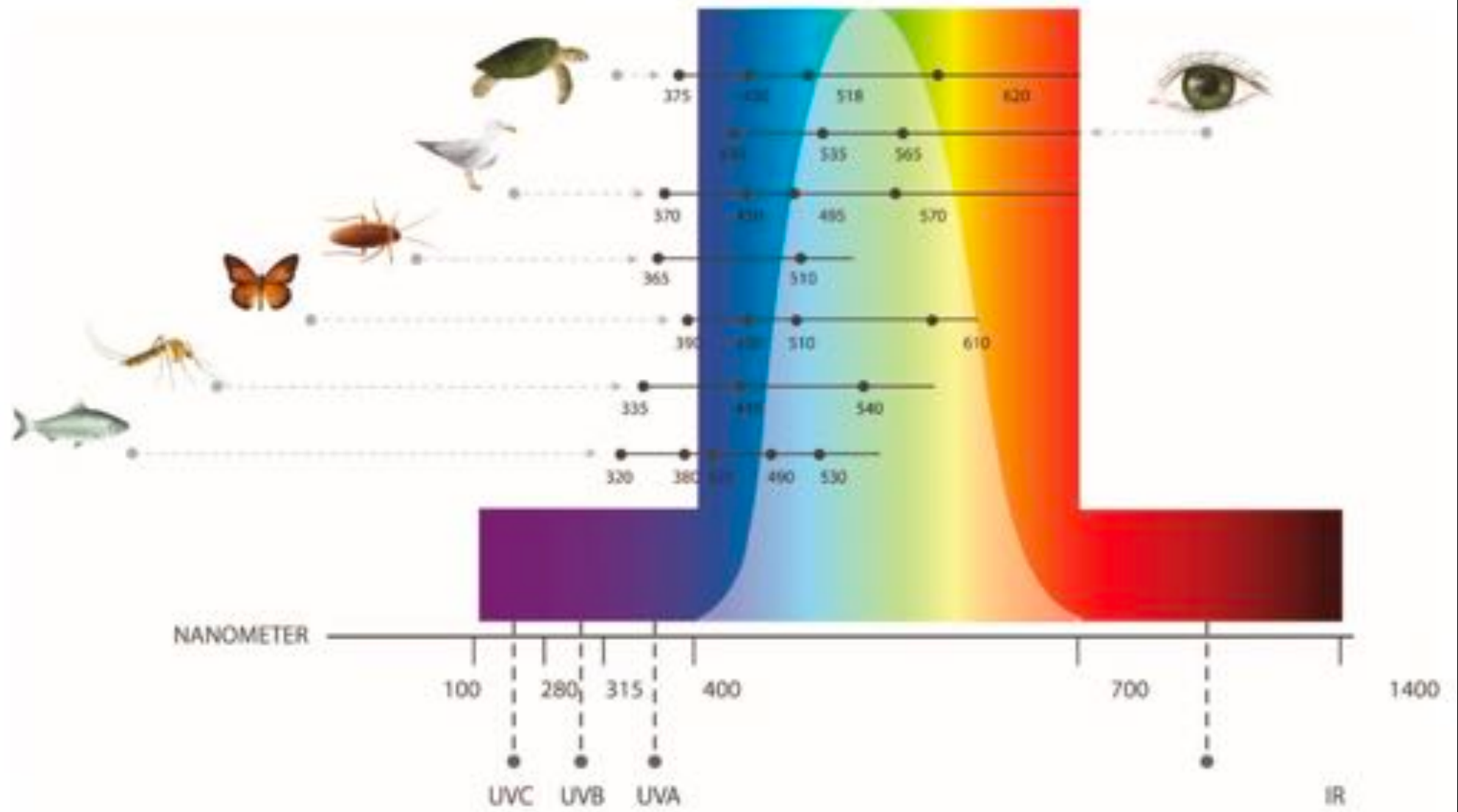


Light source

Release site

Example of artificial light effects on wildlife:
Turtle hatchlings return to beach attracted to coastal lights





Aim is not no lighting, but BETTER lighting

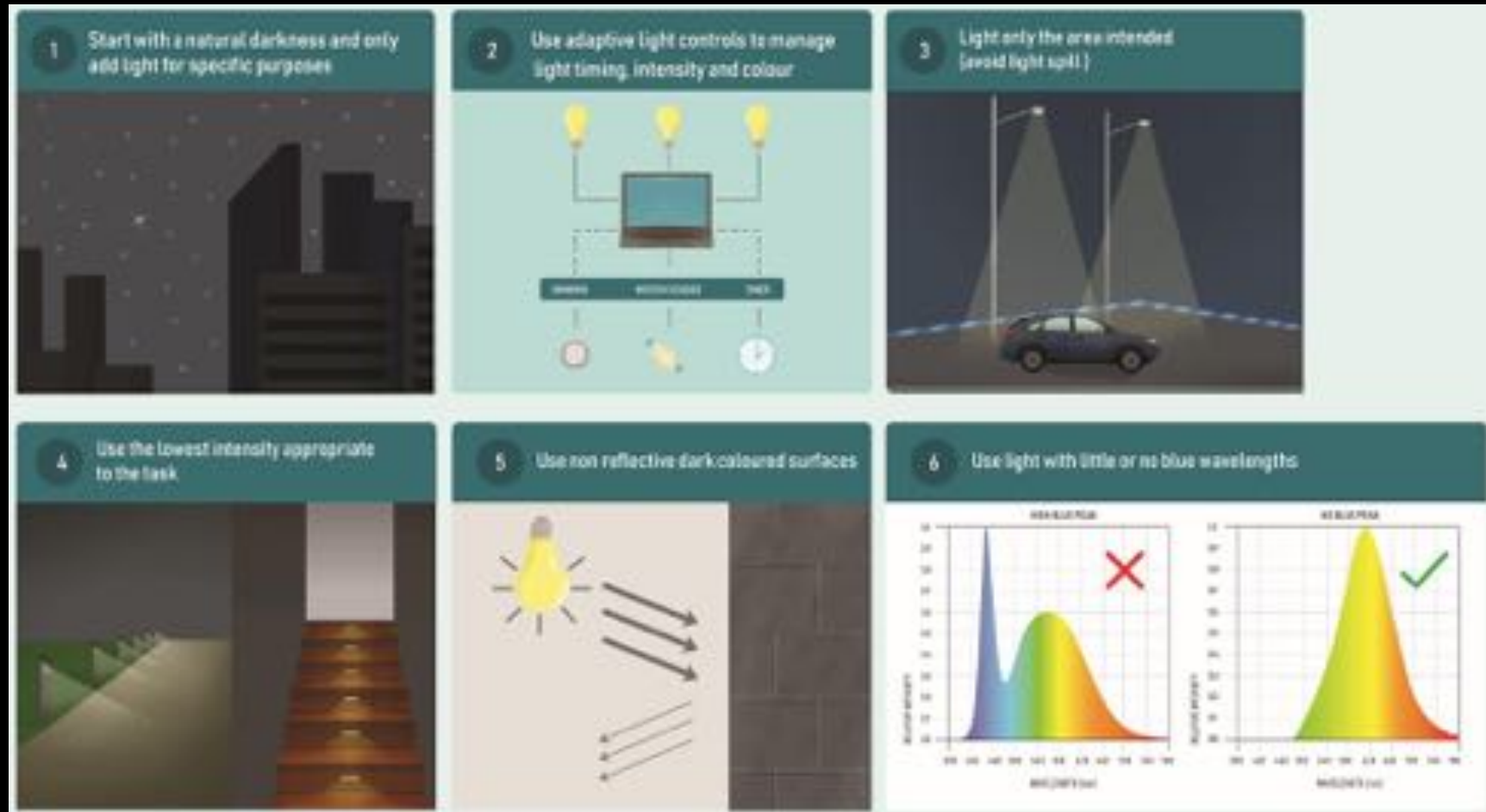
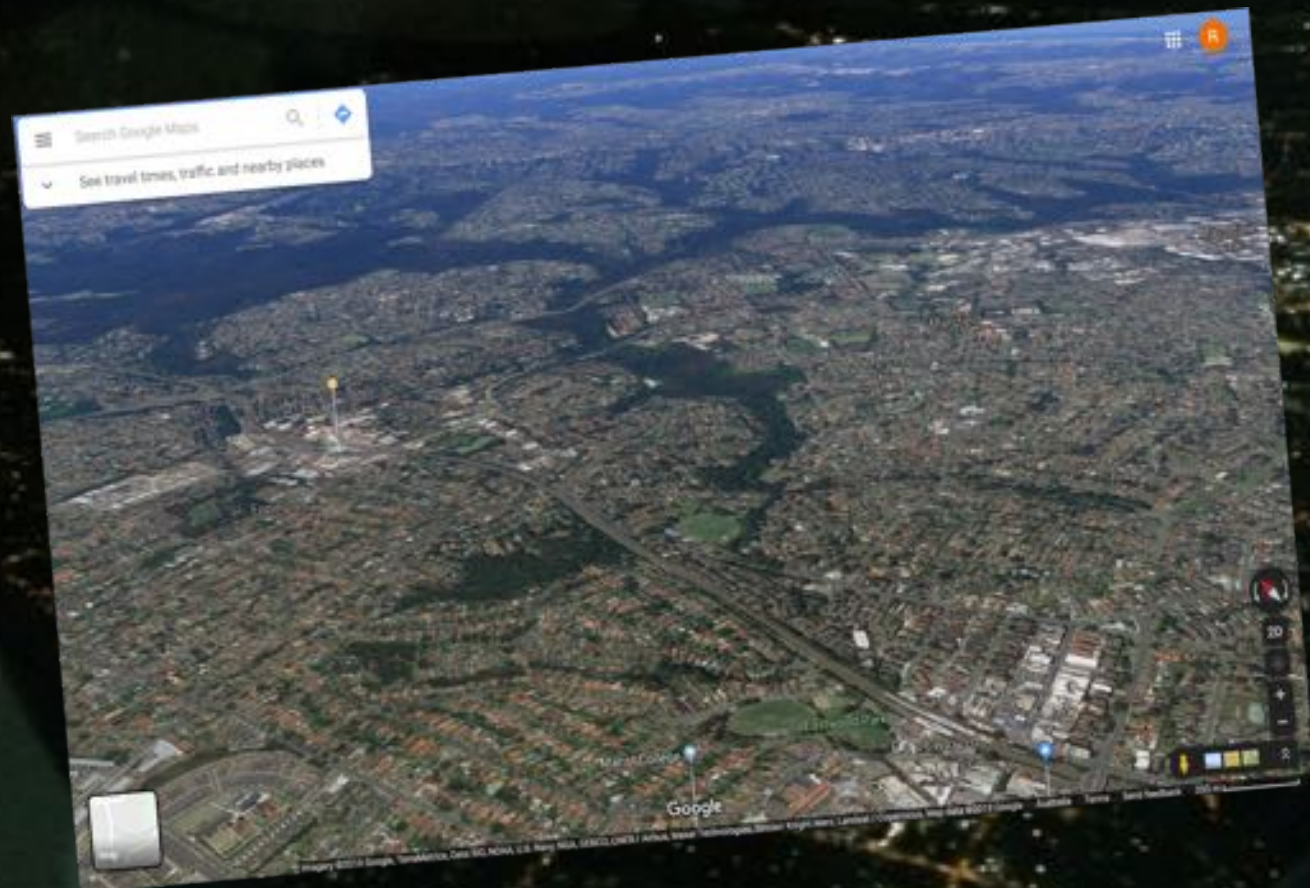


Figure 4 Principles for best practice lighting design. © Pendoley Environmental.





Problems / Questions

- Effects of artificial light are now starting to be considered by mainstream research, and effects considered by government
- Cannot manage what you don't measure
- Light is pervasive, affecting multiple scales, and effects are dependent on the context (e.g. astronomer vs turtle)
- Satellite data is lacking in terms of spatial, temporal, and spectral resolution
- Potentially well suited to drone-based research, in terms of measurement, management, and impact assessment
- What is possible? Image stabilization? Flying at night over cities?

Shot on Mavic 2 Pro

