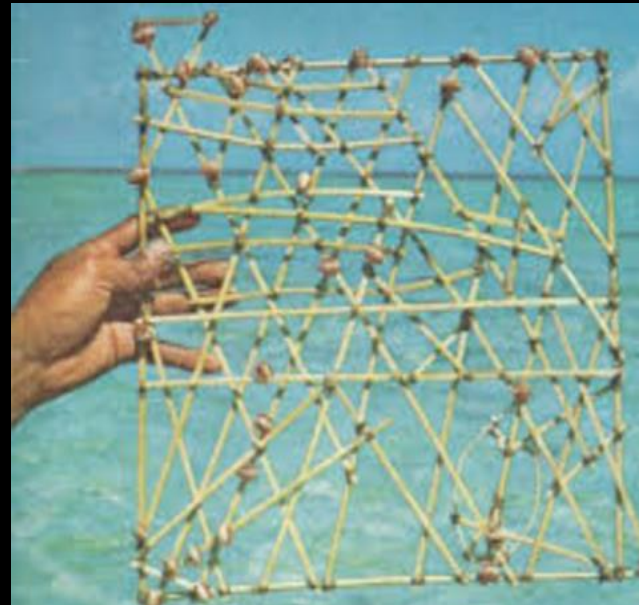
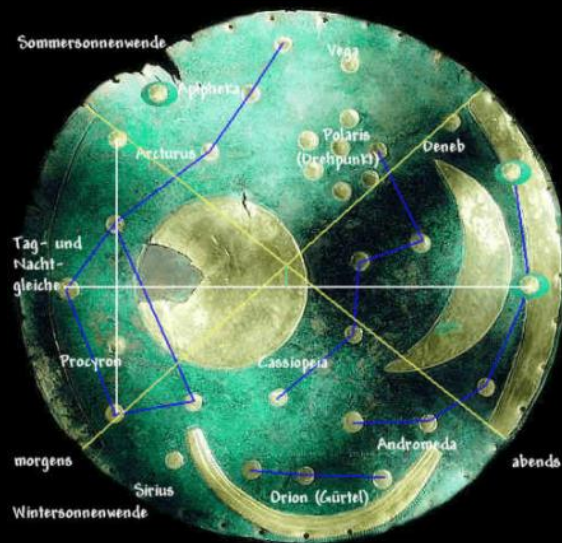
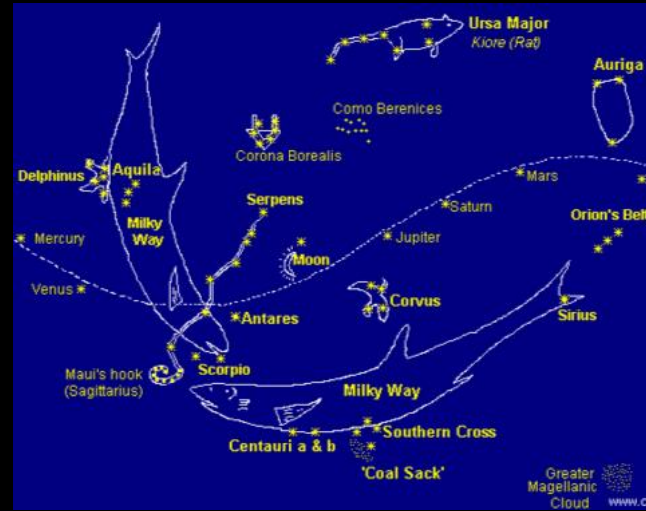
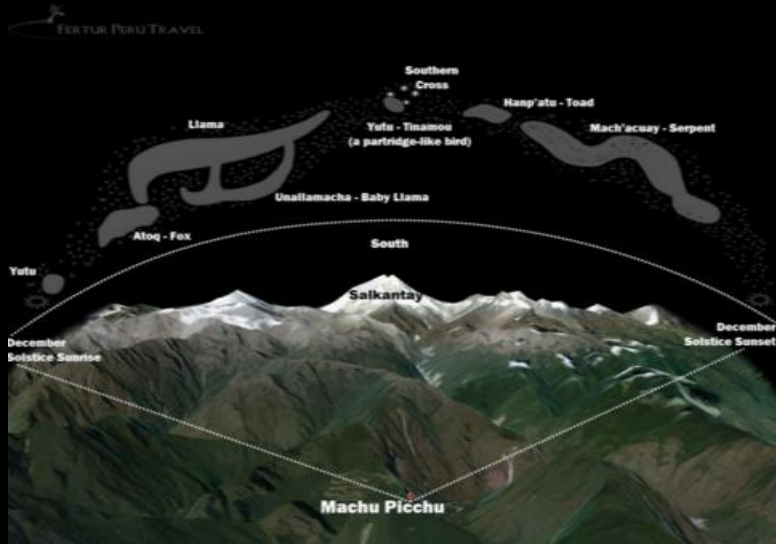


Welcome Dark Sky



Dark Sky
Astronomical
Wonder





Or not

80% of Americans cannot see
the Milky Way from their homes

Thomas Edison –
1878

Sir Humphry Davy –
1802



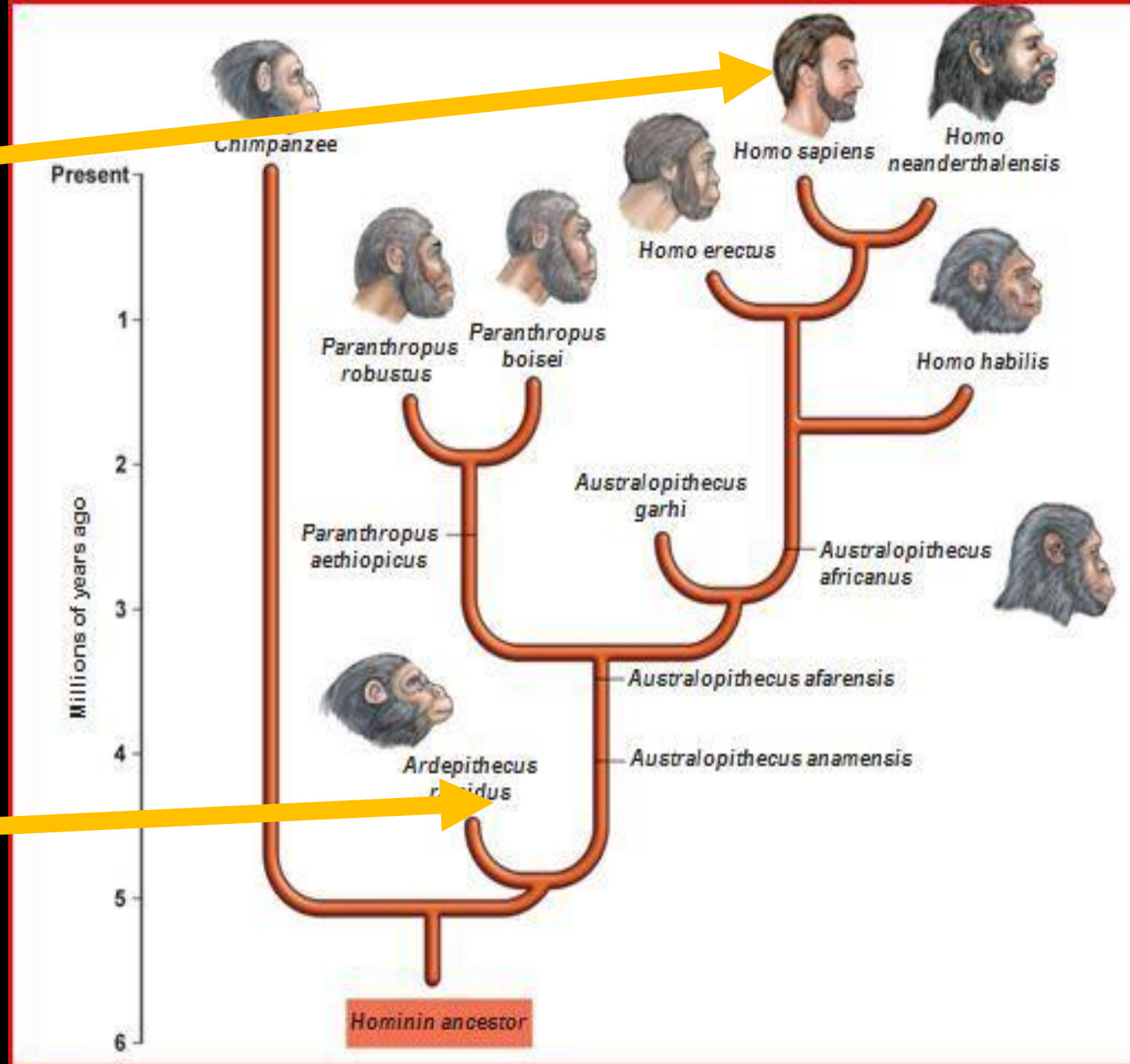
Science

2 October 2009



Ardipithecus ramidus

AAAS





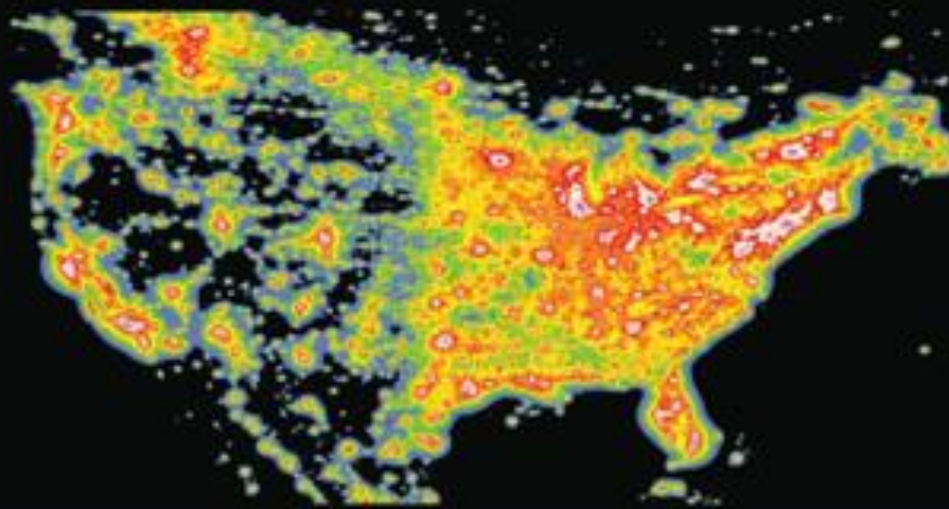
Late 1950s



Mid 1970s



1997



2025

Artificial Light at Night Affects Dark Sky

Light Pollution

Human-caused, brightening of
the night sky

Photons where they aren't
intended

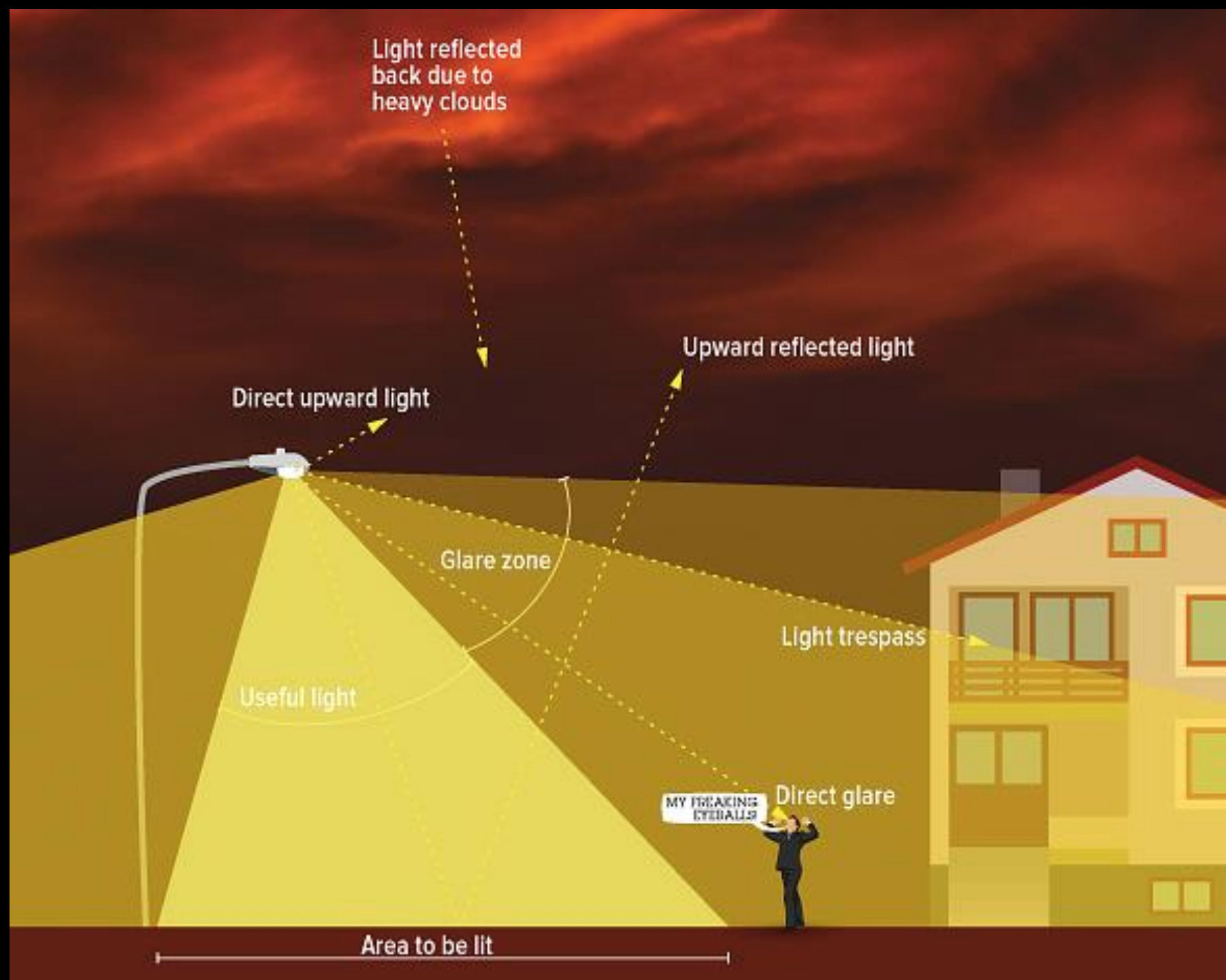
Light Trespass

Clutter

Reflected Light

Glow

Glare



How Light Polluted is Alta?



We measure light pollution using the Bortle Scale

Why Care About Dark Sky?



Dark skies matter for human health

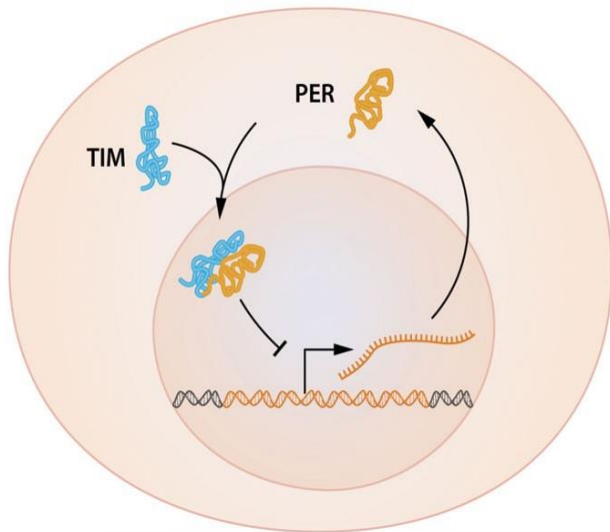


Beginning to understand how this matters

NEWS | UNITED STATES 2 OCTOBER 2017

Nobel Medicine Prize goes to Hall, Rosbash and Young

Three US geneticists' discoveries identified genes that set 'circadian clock' which regulates sleep and eating patterns.



Hall, Rosbash, Young

Credit: Chinese University of Hong Kong, Chinese University of Hong Kong, Mario Margado/Rockefeller University

Hypothalamus

Thyrotropin-releasing hormone
Dopamine
Growth hormone-releasing hormone
Somatostatin
Gonadotropin-releasing hormone
Corticotropin-releasing hormone
Oxytocin
Vasopressin

Thyroid

Triiodothyronine
Thyroxine

Pineal gland

Melatonin

Pituitary Gland

Anterior pituitary

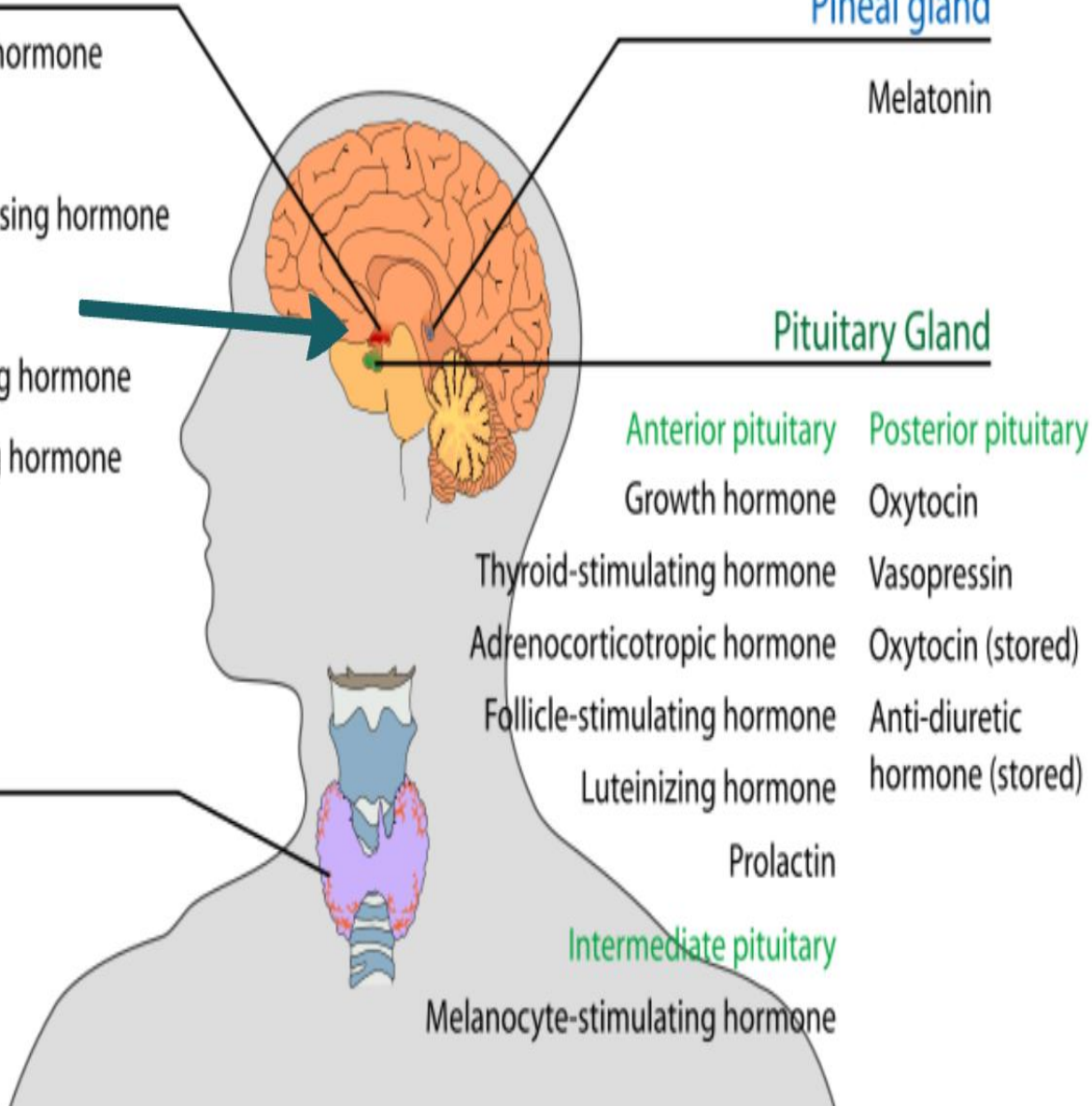
Growth hormone
Thyroid-stimulating hormone
Adrenocorticotrophic hormone
Follicle-stimulating hormone
Luteinizing hormone
Prolactin

Posterior pituitary

Oxytocin
Vasopressin
Oxytocin (stored)
Anti-diuretic hormone (stored)

Intermediate pituitary

Melanocyte-stimulating hormone



Human Health

Sleep Wake Cycle

Depression and Anxiety

Breast Cancer

Heart Disease

Blood Pressure

Dark skies matter for safety and community belonging

Fact or Fiction? More Lighting = Safer Places



Myth



Reality





Problems With Black Out Curtains

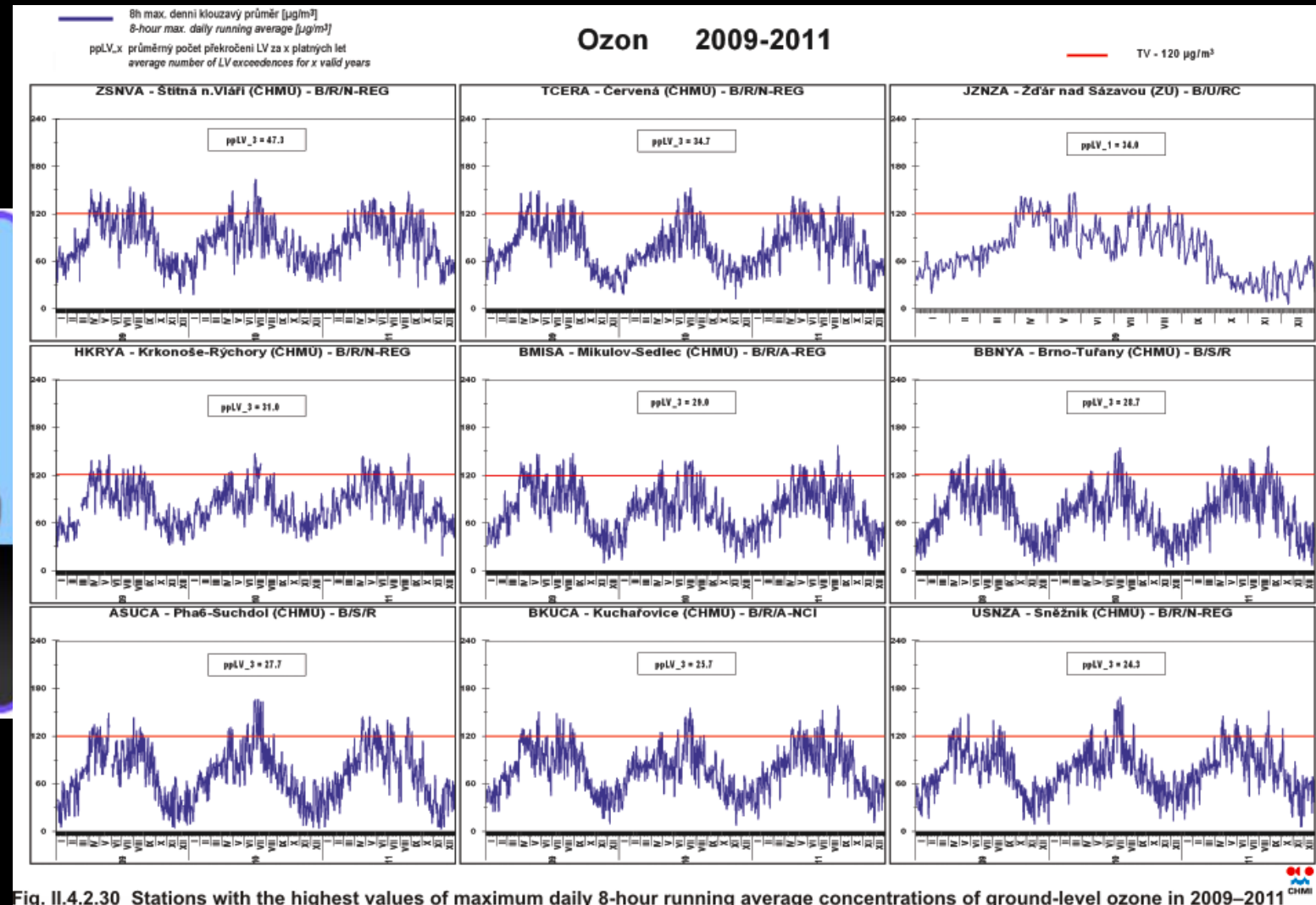
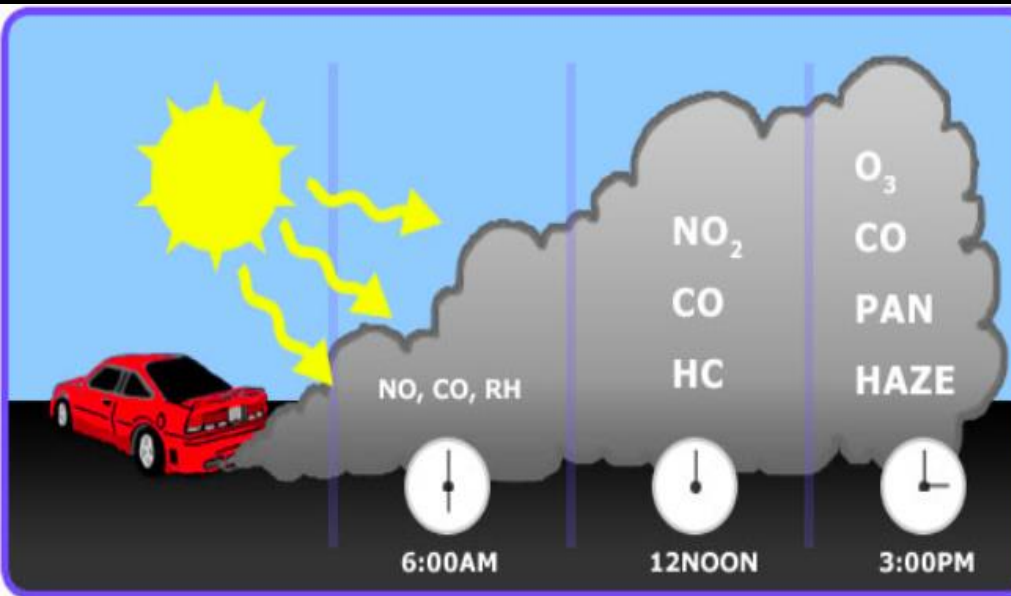


A night landscape photograph showing a dark, starry sky with the Milky Way visible. In the foreground, there are dark, silhouetted hills or mountains. In the background, several cities are visible, their lights glowing against the dark landscape. The text "Dark skies matter for air quality" is overlaid in the center in a yellow, sans-serif font.

Dark skies matter for air quality

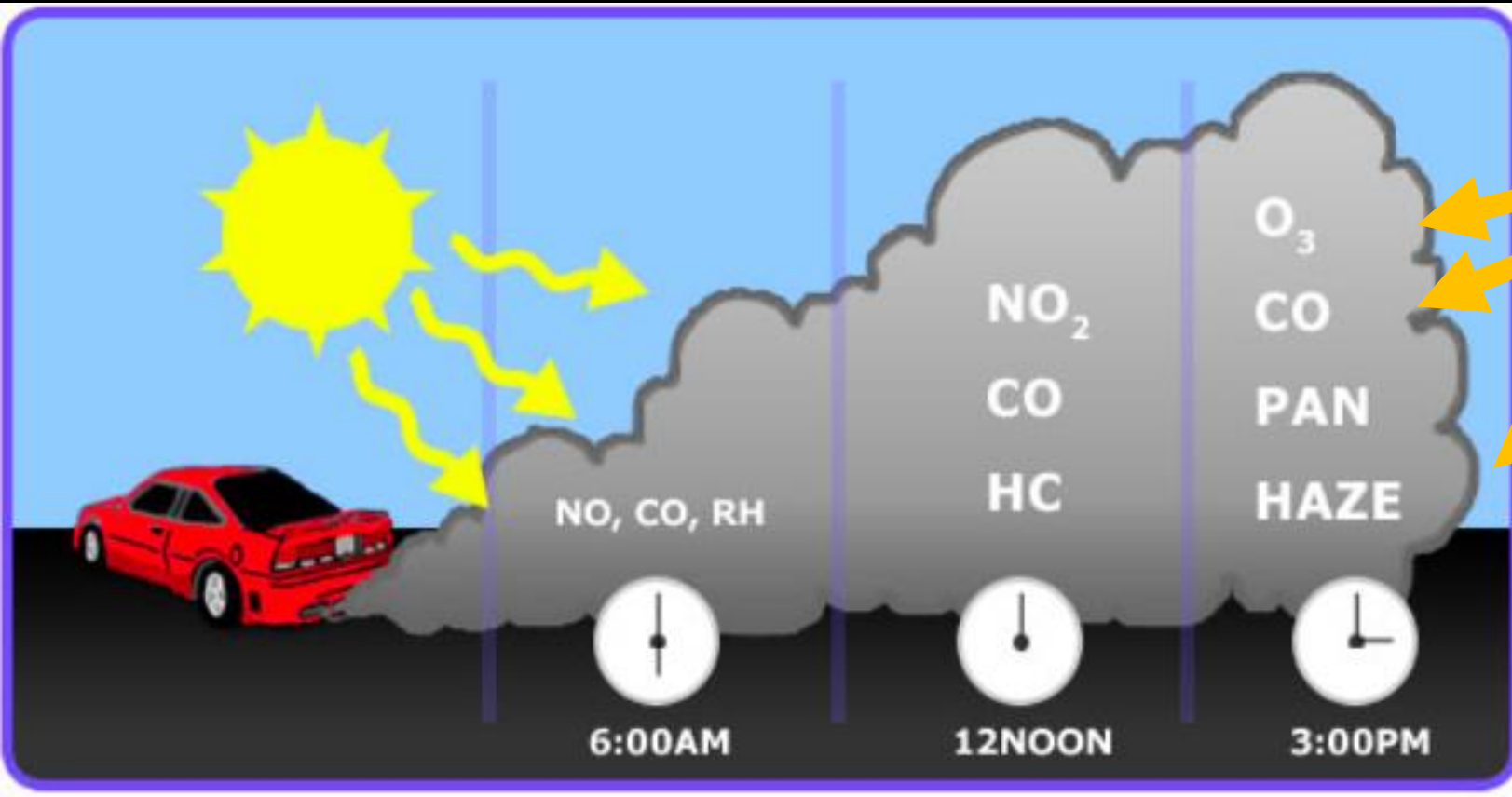


Air Quality Effects



Photochemical smog usually “cleans up” at night.

But With Artificial Light...



Photon input around the clock = decreased air quality

A night landscape photograph showing a dark, starry sky with the Milky Way visible. Below the sky, there are dark, silhouetted hills or mountains. In the valleys and on the slopes, there are numerous small, bright lights from cities and towns, creating a glowing effect against the dark terrain. The overall scene is a mix of natural beauty and human-made light pollution.

Dark skies matter for fiscal responsibility

Misdirected Light At Night
Costs \$ 3.3 Billion Annually



It is estimated that typical light fixtures waste 60% of their emitted light.

Tyler Nordgren, University of Redlands

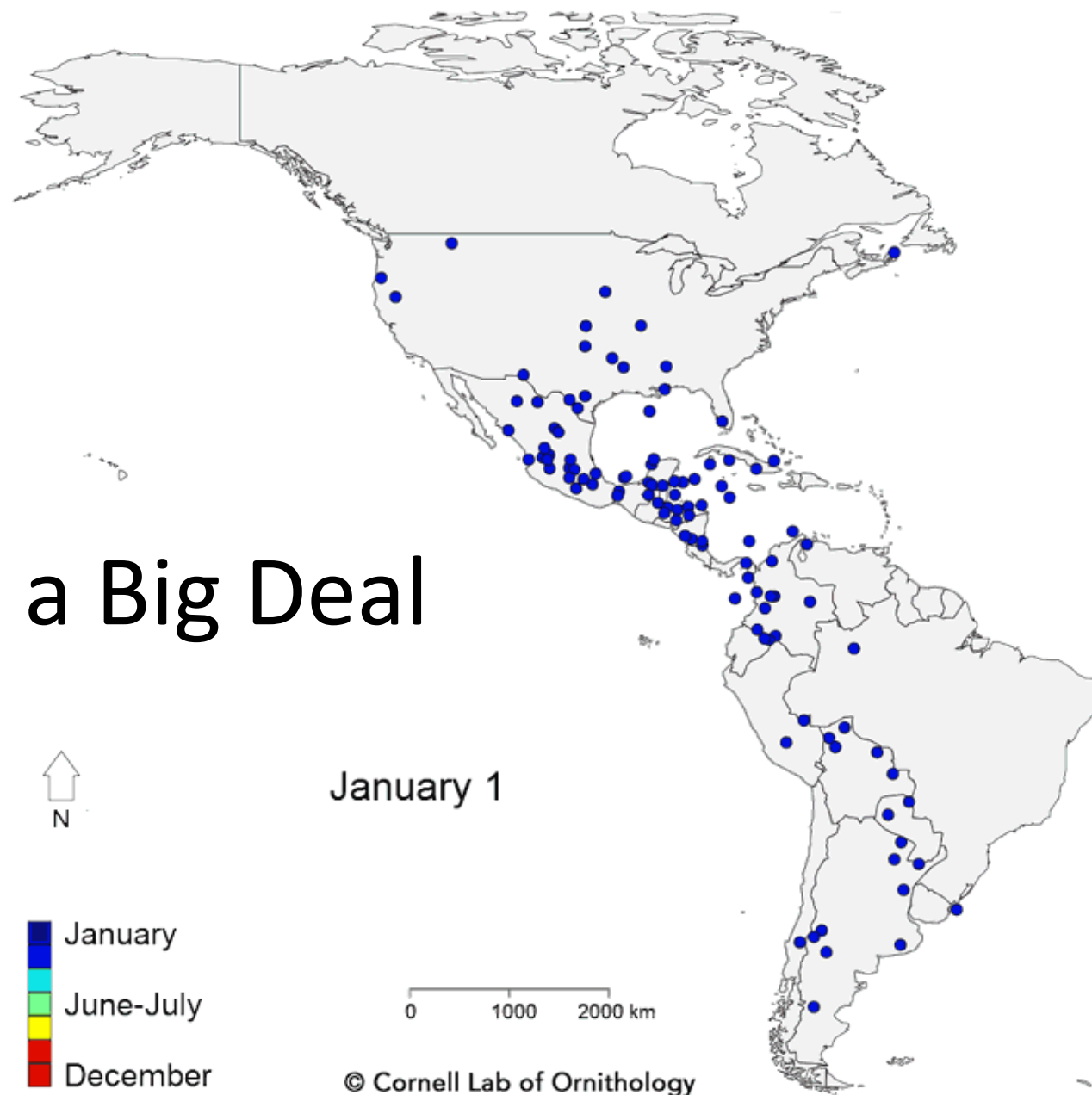
A night landscape photograph showing a dark, starry sky with the Milky Way visible. Below the sky, there are dark, silhouetted hills or mountains. In the valleys and on the slopes, there are numerous small, bright lights from cities or towns, creating a glowing effect against the dark terrain. The overall scene is a mix of natural beauty and human-made light pollution.

Dark skies matter for nature

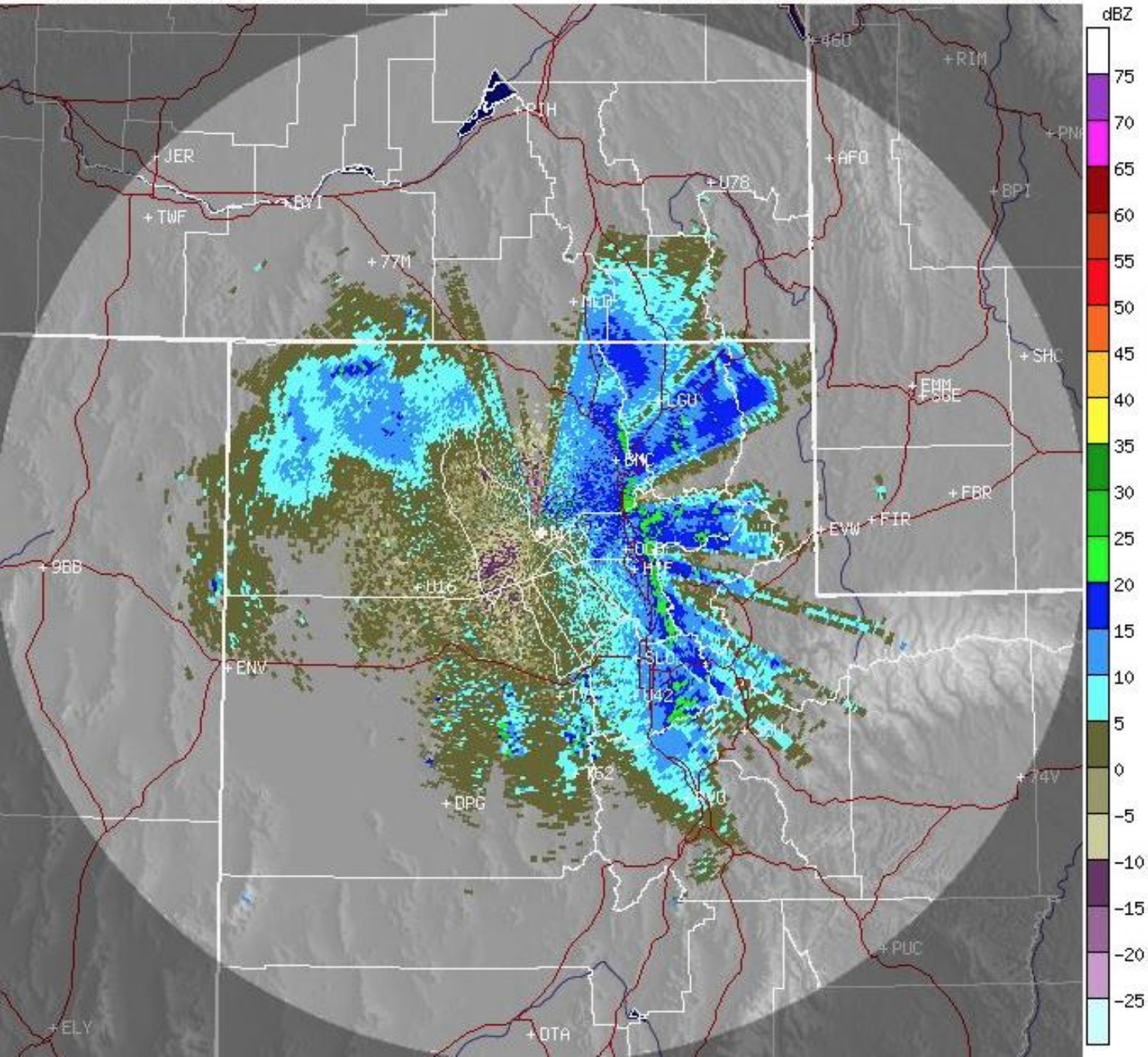
Time to Talk about the Birds!



Songbird Migration is a Big Deal



KMTX -- Salt Lake City, UT/Box Elder County 03:31:12 UTC Tue 05 September 2017
Base Reflectivity: 0.5 degrees, Clear-air Mode (c) UCAR <http://www.rap.ucar.edu/weather/radar/>



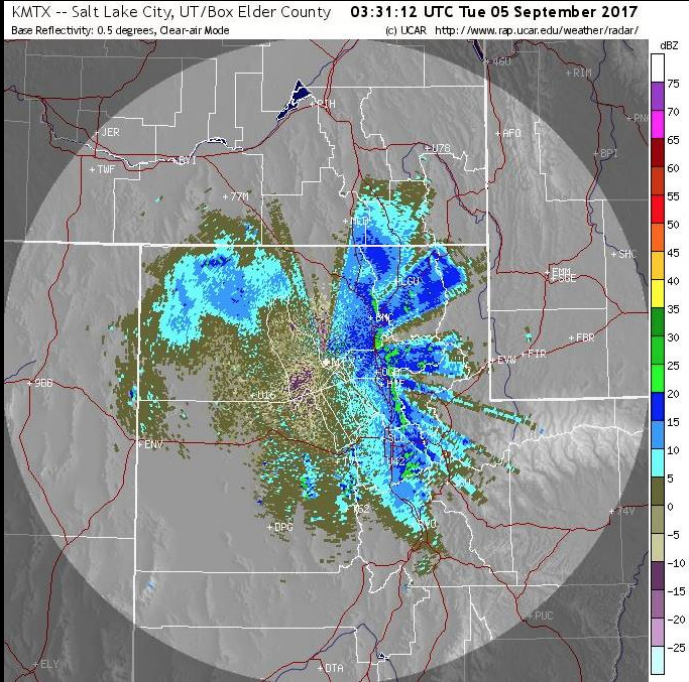
2/3 of Songbirds Migrate at Night



© 2014. Robert Miller.

Cities and Lights Get in Their Way

They Get Confused



Light Confusion Kills ~ **1 billion** Songbirds in North America





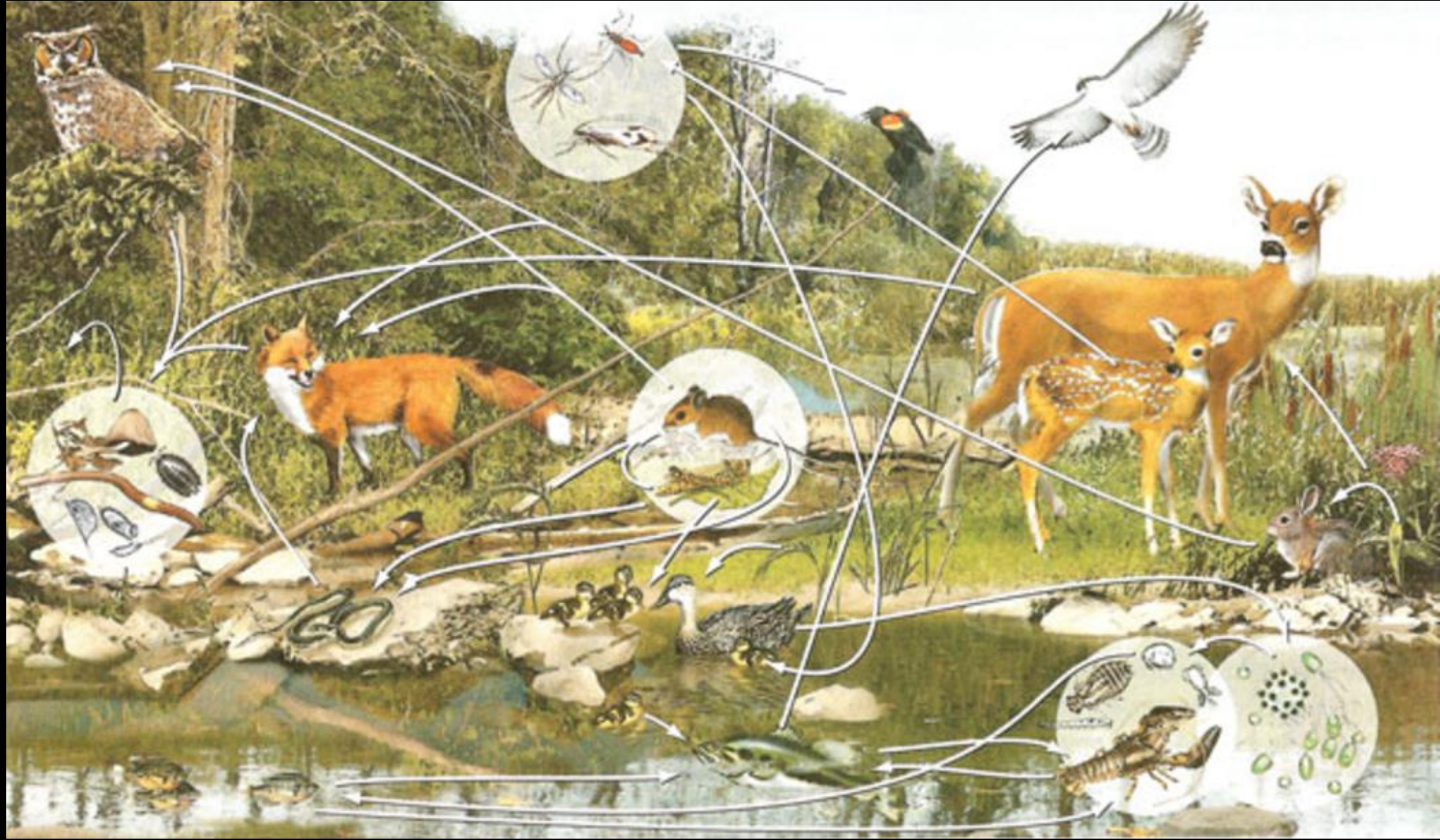
Other
Elements
of Nature

Photo by Fraser Clarke

Nocturnal Wildlife



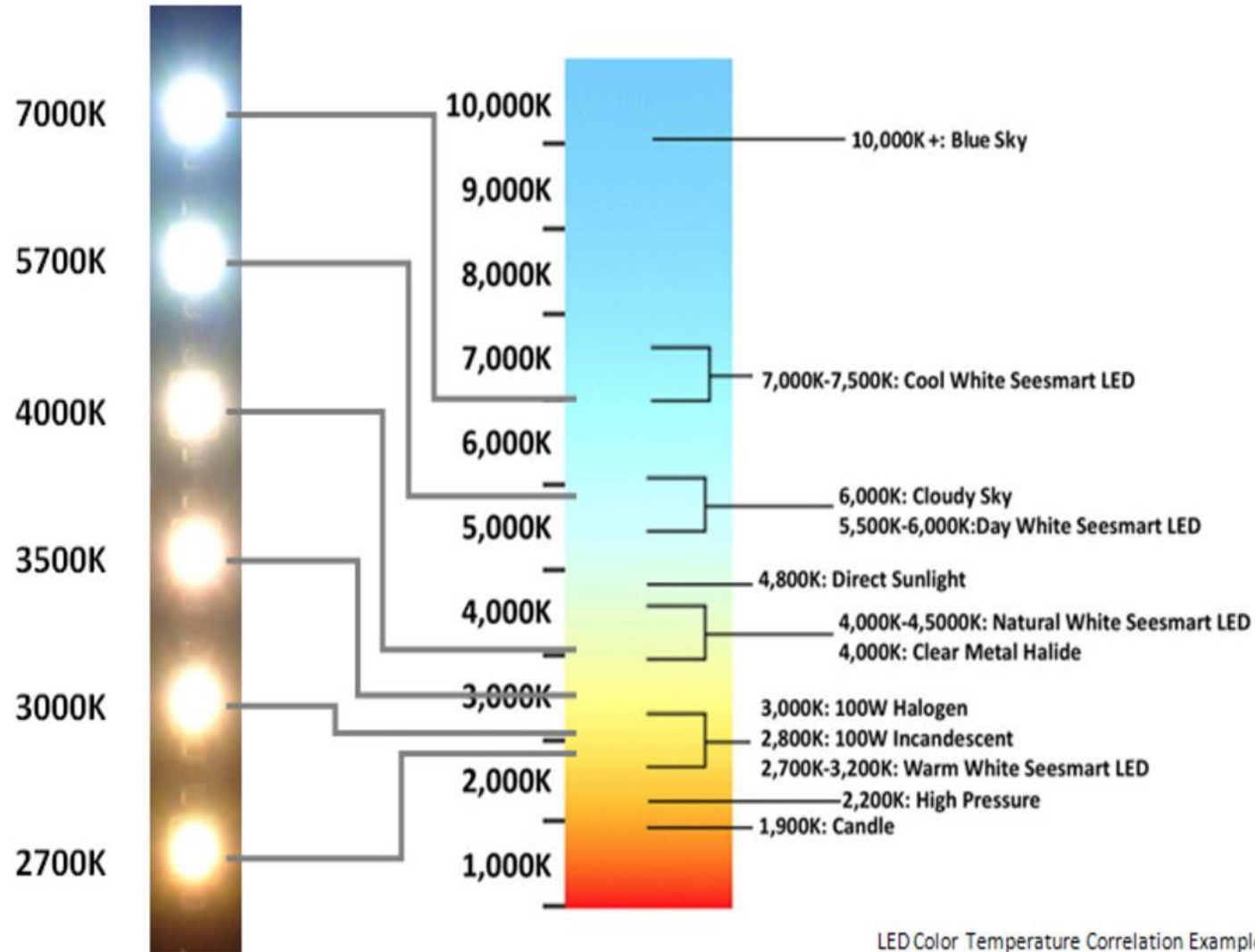
Food webs are complex. Impacts are hard to predict.





Basic LED Reference Example

Kelvin Color Temperature Scale Chart

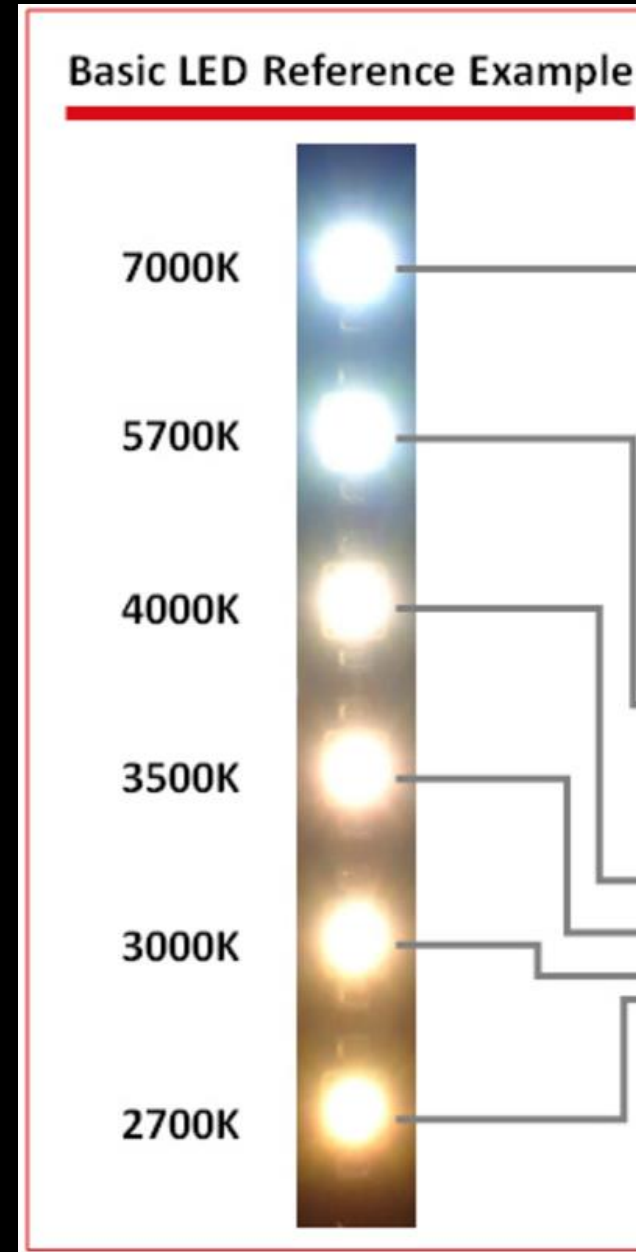


LED Color Temperature Correlation Example



Artificial Light at Night
+
Caring for the Dark Sky

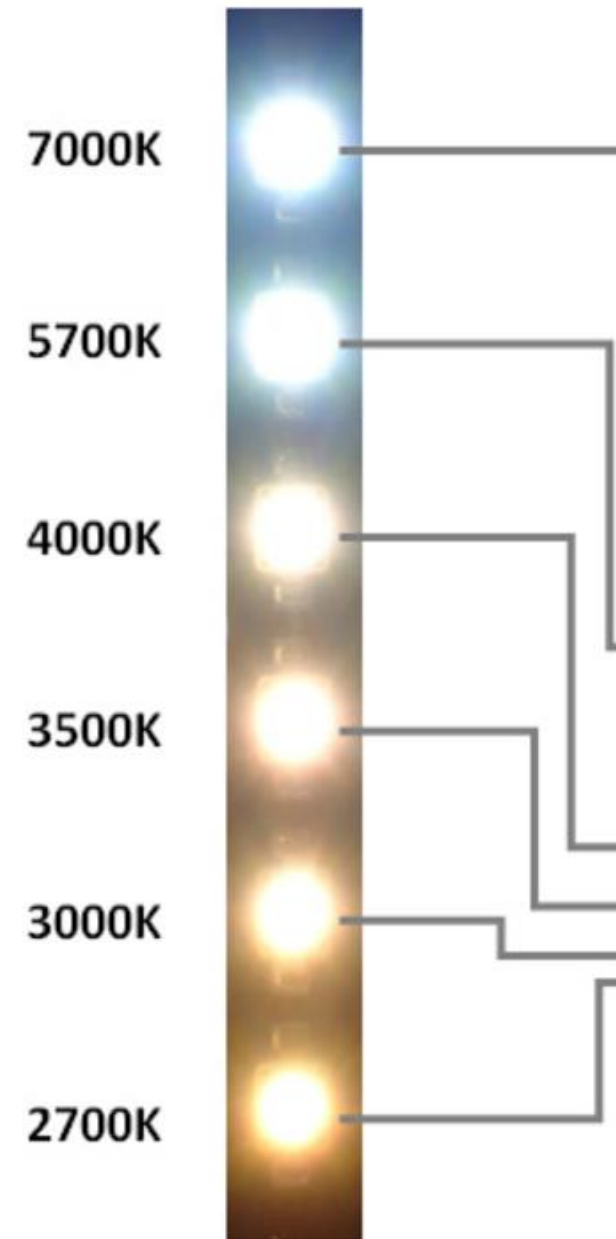
Lights Below 3000K are Best



Blue Light is Not So Good



Basic LED Reference Example



What are Important Lighting Considerations for Dark Sky?

Lights should be

Warm White

(color temp. below 2500 K)

Only on When Needed

Motion Sensing

Fully Shielded

Advanced Controlled / Dimming

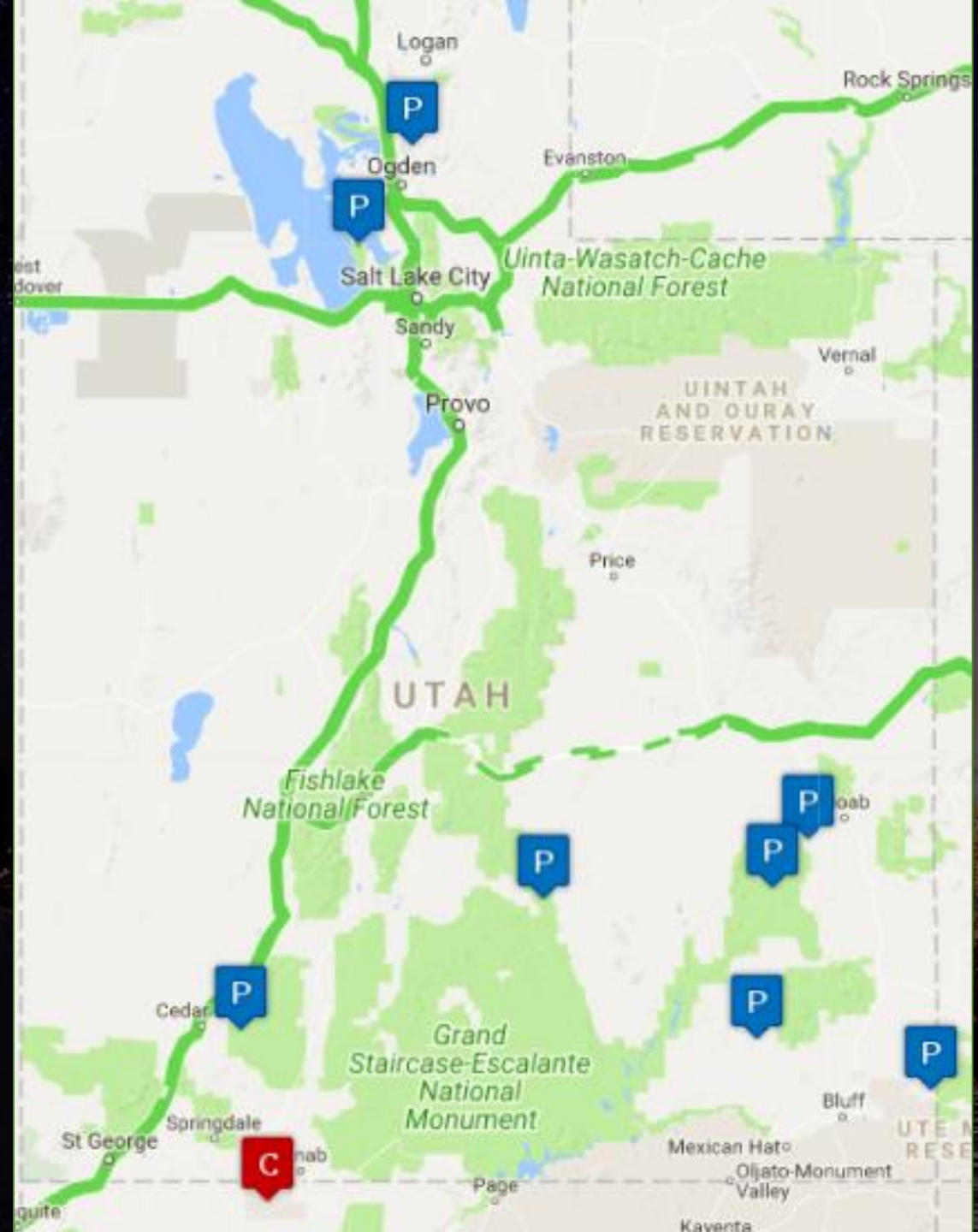


AWE of Dark Sky is Good for Us

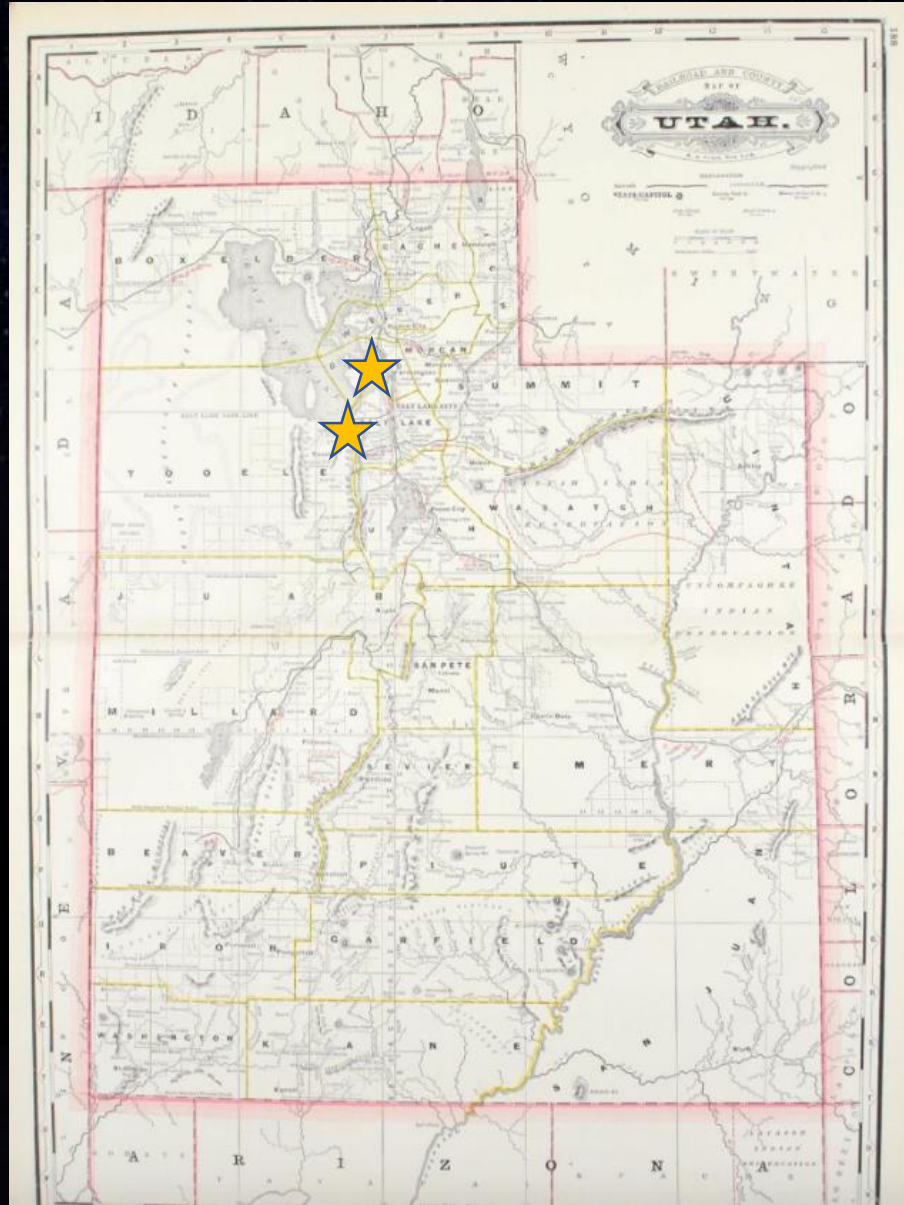


Casey Grimley

Utah is An Important Dark Sky Place



Two
Dark Sky
Urban
Adjacent
Dark Sky
Parks



North Fork Park
(Eden, Utah)

Antelope Island
State Park

How Communities Are Turning On the Night

<https://utah.maps.arcgis.com/apps/Cascade/index.html?appid=3f60caabf8ef49d2b1ebddaebfecee79>