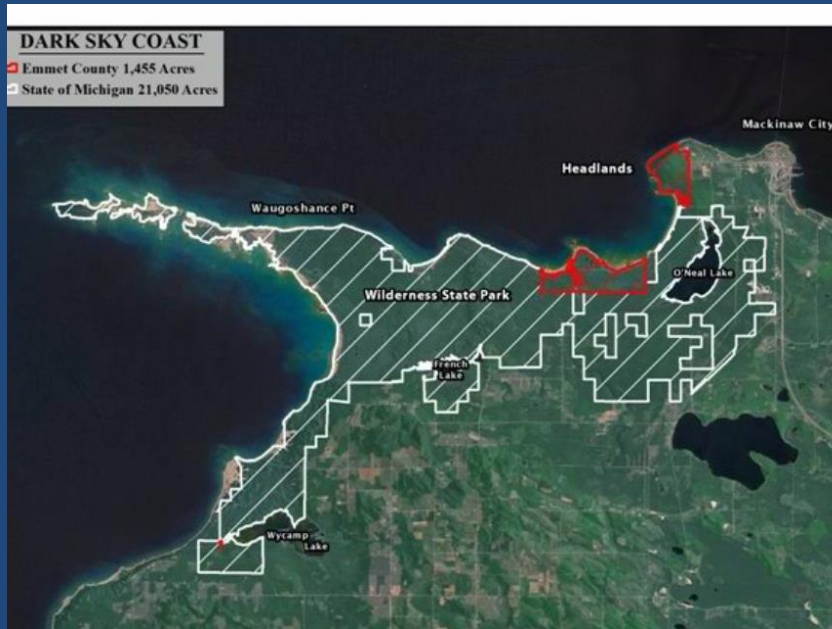




Great Lakes ~ Dark Skies
*Effecting Positive Change by Keeping it
Dark in Michigan*

Mary Stewart Adams
Program Director
Headlands International Dark Sky Park



Emmet County's Headlands property
Established as the 6th International
Dark Sky Park in the US and 9th in the world
2011

Due to the success of Headlands
Michigan protected 23,000 acres of state land
In 2012



In 2016 that legislation was amended to
Include several more state parks, bringing
The total number of protected acres to 35,000

There are at least two national parks in
Michigan now seeking the same
International designation as Headlands

The International Dark Sky Association estimates that least 30 percent of all outdoor light used at night in U.S. is wasted, mostly due to unshielded lights that spill unnecessary light up into the sky.

That 30% adds up to about \$3.3 billion and the release of 21 million tons of carbon dioxide per year! To offset all that carbon dioxide, we'd have to plant 875 million trees annually.



Over 70 lighthouses dot the 1600+ miles of Lake Michigan shoreline (including islands)

12 million people populate over 60 cities along these shores



With 12 million people populating the 60 cities
on the shores of Lake Michigan,
we are potentially contributing \$124M to that waste of light,
which equals about 2.5M barrels of oil,
or 2.9M metric tons of greenhouse gasses.



- Street lighting as we know it began approximately 300 years ago.
- These were oil lamps placed on wooden poles
- By the early 18th century oil lamps were still used but the poles and lamps were made of cast-iron fixtures.
- The beginning of the 19th saw gas lamps come into use.
- By the 20th century electric lamps were in wide use.



A nighttime photograph of a city waterfront. In the foreground, a park with palm trees and walkways is illuminated by streetlights. To the right, a multi-lane road shows light trails from traffic. In the background, a city skyline is visible across a body of water.

What has become of Louis' lighting now?

- Street lighting
- Roadway lighting
- Parks
- Stadiums
- Parking lots
- Landscaping
- Residential
- Buildings
- Pedestrian and Bicycling Pathways

Purpose of outdoor lighting

- *Provide a safe and secure environment at night.*
- *Extend the use of parks and walkways into the night.*
- *To enhance historic/notable features*
- *To enhance travel on the roads and at intersections.*

What is light pollution?

A world map at night, where the continents are outlined by a dense network of yellow and white lights representing city lights and urban areas. The background is a dark, deep blue, suggesting a night sky. The lights are most concentrated in North America, Europe, and East Asia.

- *It is wasted light that performs no function or task*
Such as sky glow
Glare
- *It is artificial light that goes where it's not supposed to go*
Neighbor's window
Into the sky

Negative Impact on Wildlife

- *Animals and plants live by a rhythm based on a 24 hour cycle. Wildlife and fish can become disoriented by too much artificial light at night*
- *It interferes with migration, mating, foraging for food, and sleep*



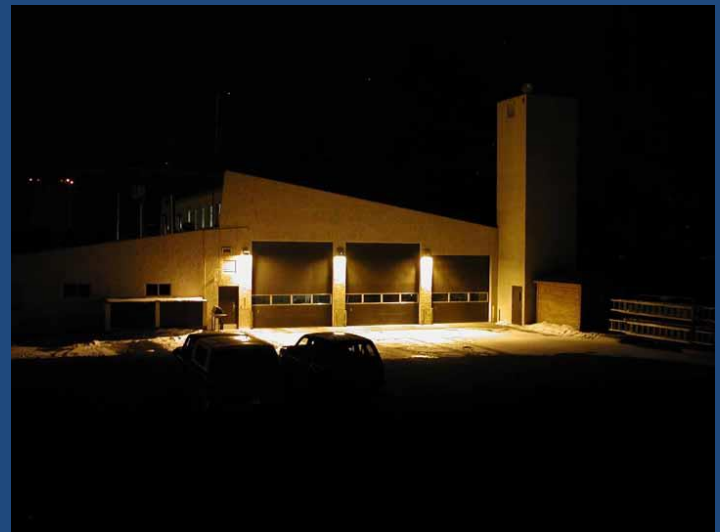
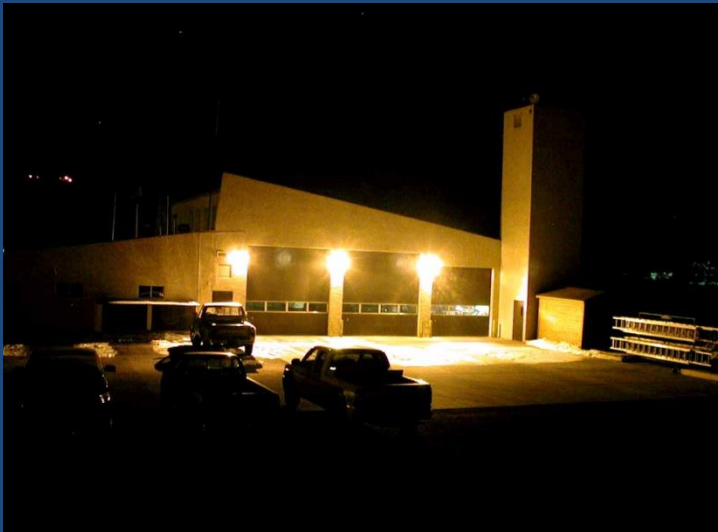
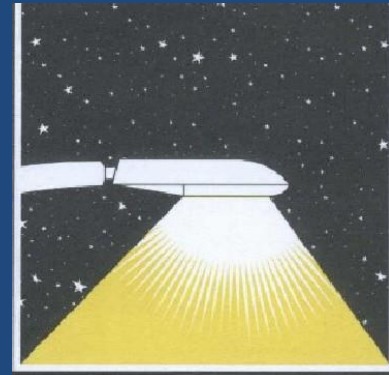
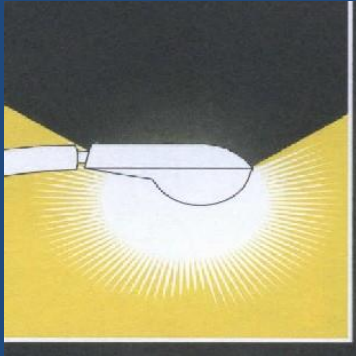
NORTHERN SPOTTED OWL
U.S. Fish and Wildlife Service/Jeff Hollingsworth

Negative Impact on Human Health

- *Light trespass into bedrooms disrupts sleep patterns*
- *Glare in our eyes can be blinding and reduce our night vision*
- *New research is being done to discover the impact to our biological clocks*



Shielded Luminaires



Types of Lamps

- *There are four basic types:*

Incandescent

Fluorescent

High-intensity discharge

- *Including: Mercury Vapor, Metal Halide, High Pressure Sodium and Low Pressure sodium*

Light Emitting Diode (LED)

- *LED technology is still relatively new*



CFL



High-Pressure Sodium



Low-Pressure Sodium

It all sounds great and I commend you on the effort to make a light to attract them,
but I find(especially when I lived in Vermont mountains),
all I needed to do was turn on the outside lights at the doors
and it became a gigantic bugfest!

I needed to tape every sleeve shut, plug my ears with cotton,
and wear goggles just to keep the insects from climbing
into every possible crevice on/in my body!

You know you love to
collect/study insects in a big way when you have 30-40 of them
in your shirt and pants, up your nose,
in your ears, and you just keep on looking for new insects!

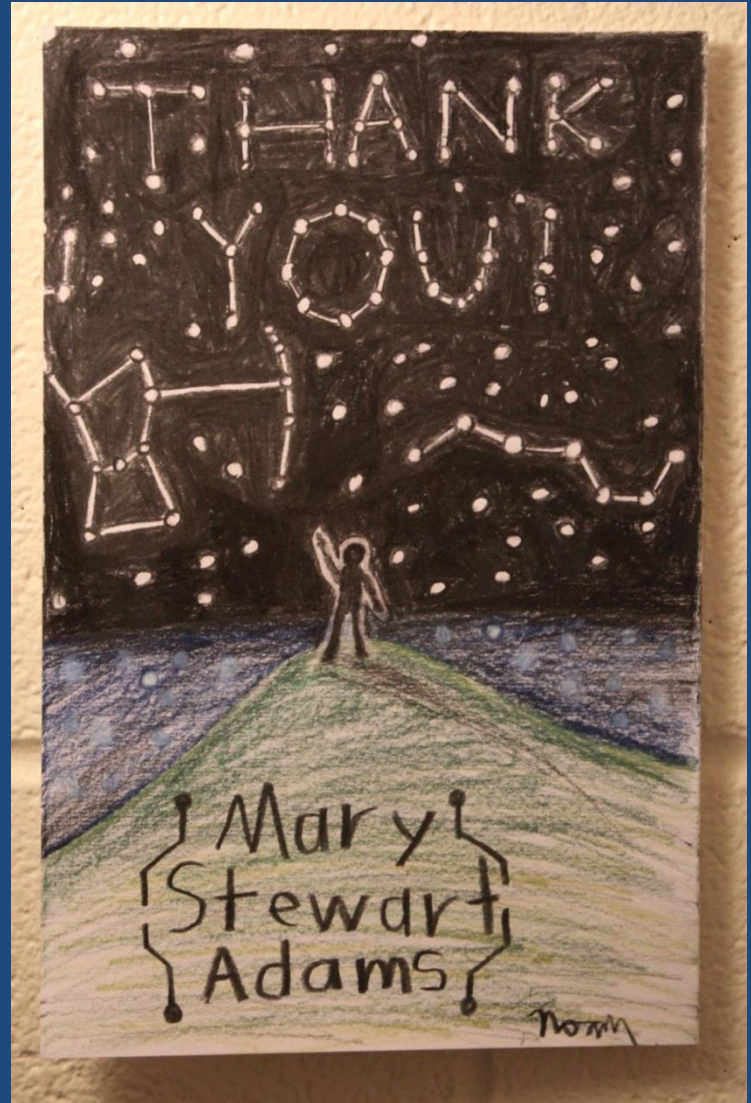
One time I even stuck a UV light out from my aquarium top
and the insects came so thickly(mostly some type of dipterans),
that june bugs were buried completely in the pile!

So if you have no time or patience to build a light attractor don't worry,
I'll keep the front lights on for you/them.



johnhillphotos

Headlands International Dark... >



Thank You

Thank you so much,
the dark sky
park was really
fun. I think that
dark sky parks
are really cool ideas
that should be
encouraged. Keep
up the good work!