

DARK SKY PROJECT

**CAPRICE PHILLIPS
SLEEPING BEAR DUNES NATIONAL LAKESHORE
NIGHT SKIES ASSISTANT
SUMMER 2016**



MOSAICS IN SCIENCE

- Internship Program that provides youth that are under-presented in natural resources science career fields with on-the-ground, science based work experience with the National Park Service
- Funded through the National Park Service and partners with the Greening Youth Foundation



Greening Youth
FOUNDATION

INTERNATIONAL DARK SKY ASSOCIATION

- “To preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting”



www.darksky.org



SLEEPING BEAR DUNES NATIONAL LAKESHORE



HOME SWEET, LYME DISEASE?





PROCESS OF LIGHTING INVENTORY

LIGHTING INVENTORY

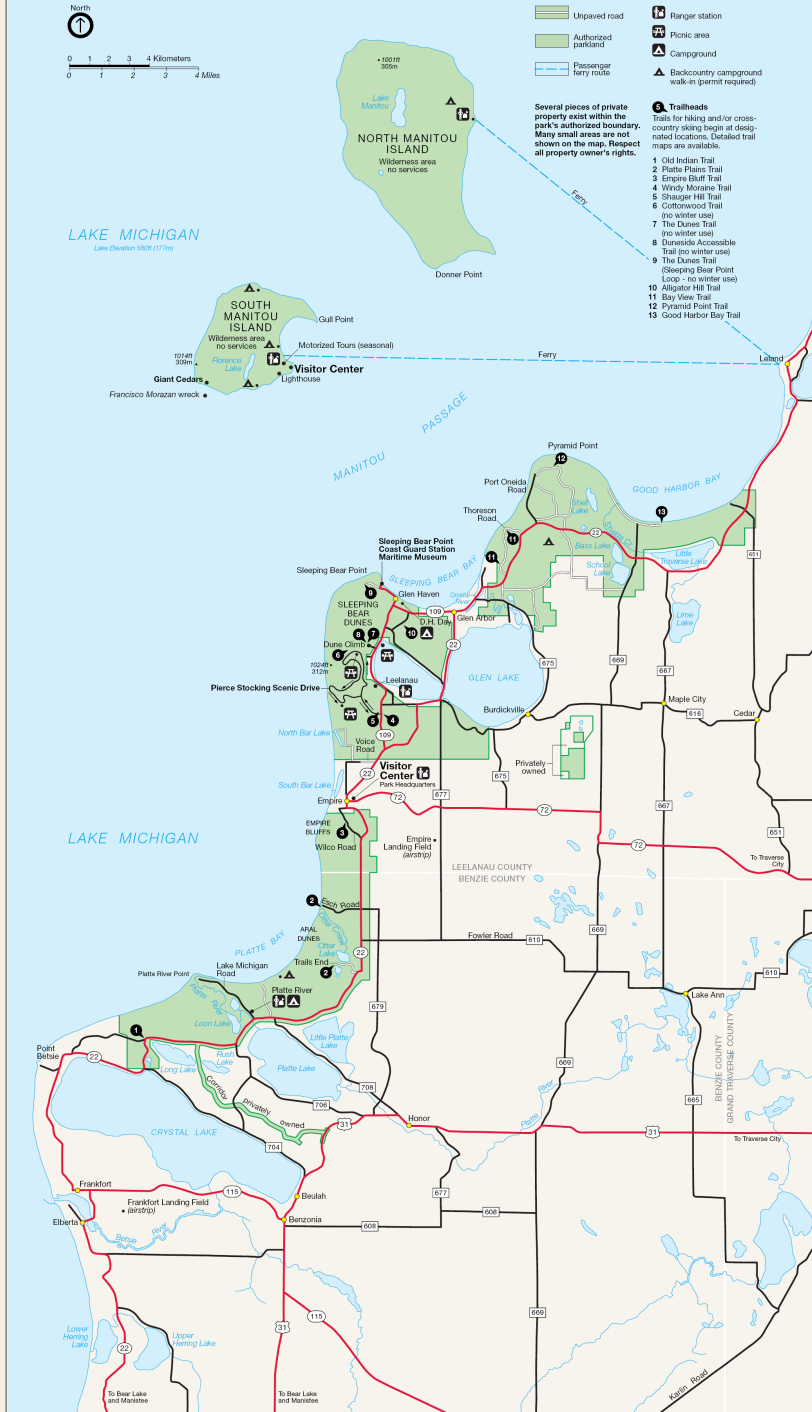
- Photo documented exterior lights on buildings that Sleeping Bear Dunes National Lakeshore owns.
- Collected data on light fixtures (wattage, type, etc.)





0 1 2 3 4 Kilometers
0 1 2 3 4 Miles

LAKE MICHIGAN
Lake Elevation 592ft (177m)



Several pieces of private property exist within the park's authorized boundary. Many small areas are not shown on the map. Respect all property owner's rights.

Trailheads
Trails for hiking and/or cross-country skiing begin at designated locations. Detailed trail maps are available.

- 1 Old Indian Trail
- 2 Platte Plains Trail
- 3 Empire Bluff Trail
- 4 Windy Monksie Trail
- 5 Shauger Hill Trail
- 6 Cottonwood Trail (no winter use)
- 7 The Dunes Trail (no winter use)
- 8 Duneside Accessible Trail (no winter use)
- 9 The Dunes Trail (Sweeping Dunes Point Loop - no winter use)
- 10 Alligator Hill Trail
- 11 Bay View Trail
- 12 Pyramid Point Trail
- 13 Good Harbor Bay Trail

- Unpaved road
- Authorized parkland
- Passenger ferry route
- Ferry
- Ranger station
- Picnic area
- Campground
- Backcountry campground (walk-in (permit required))

PLATTE RIVER DISTRICT



LEELANAU DISTRICT



NORTH AND SOUTH MANITOU ISLANDS





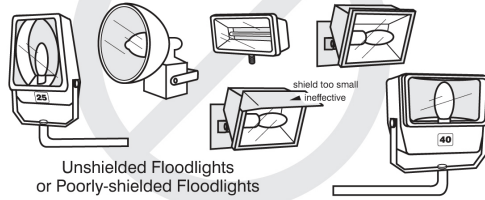
THE GOOD, THE BAD, AND THE UGLY



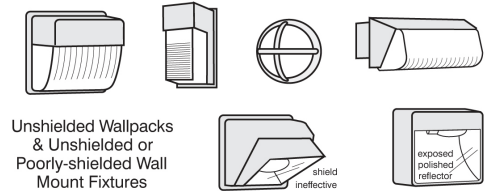
Examples of Acceptable / Unacceptable Lighting Fixtures

Unacceptable / Discouraged

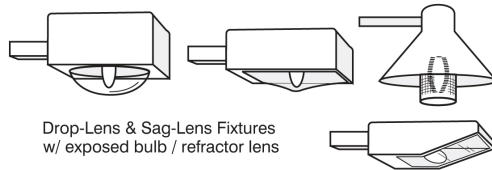
Fixtures that produce glare and light trespass



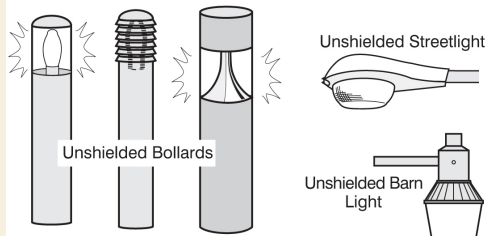
Unshielded Floodlights or Poorly-shielded Floodlights



Unshielded Wallpacks & Unshielded or Poorly-shielded Wall Mount Fixtures

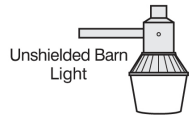


Drop-Lens & Sag-Lens Fixtures w/ exposed bulb / refractor lens

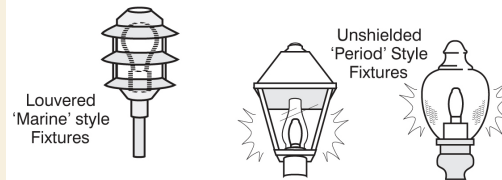


Unshielded Streetlight

Unshielded Bollards

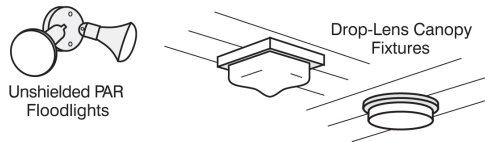


Unshielded Barn Light



Louvered 'Marine' style Fixtures

Unshielded 'Period' Style Fixtures

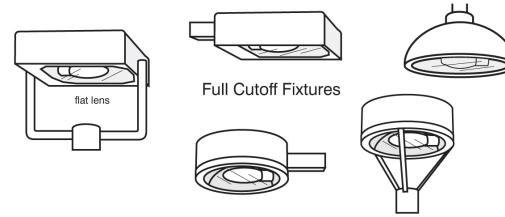


Unshielded PAR Floodlights

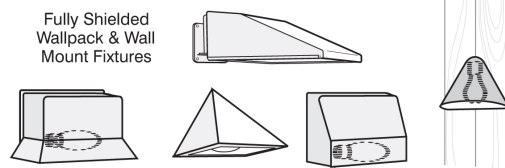
Drop-Lens Canopy Fixtures

Acceptable

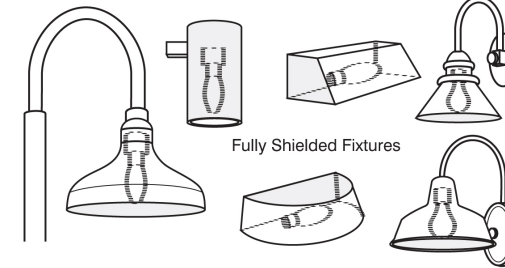
Fixtures that shield the light source to minimize glare and light trespass and to facilitate better vision at night



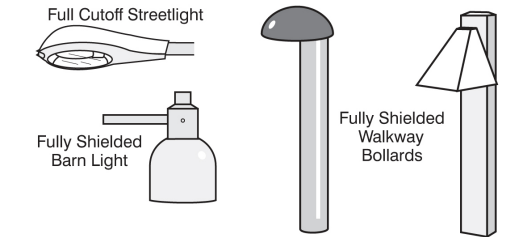
Full Cutoff Fixtures



Fully Shielded Wallpack & Wall Mount Fixtures



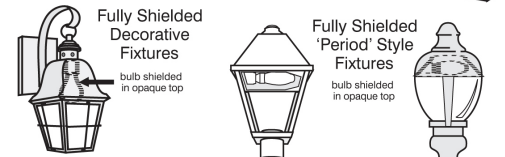
Fully Shielded Fixtures



Full Cutoff Streetlight

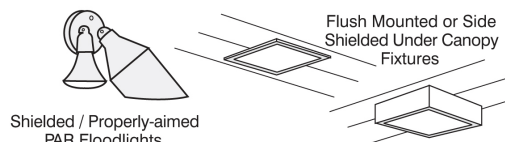
Fully Shielded Barn Light

Fully Shielded Walkway Bollards



Fully Shielded Decorative Fixtures
bulb shielded in opaque top

Fully Shielded 'Period' Style Fixtures
bulb shielded in opaque top







Shielded / Properly-aimed PAR Floodlights

Flush Mounted or Side Shielded Under Canopy Fixtures

Platte River District Lighting Inventory



Location	Fixture	Fully-Shielded	Photo	<500 lumens	Application	Conformity with Proposed Lighting Zone
Platte River Campground Maintenance Office	3 fixtures 13W Fluorescent Photocell Yellow	Partial (roof eave)		NO	Building egress	NO (recessed canopy)
Platte River Campground Amphitheater	35 fixtures 9W Flush Compact Wall Lights Photocell Yellow	NO		NO	Pathway illumination	NO (install grate that points light downward)
Platte River Campground Amphitheater	29 fixtures Bollards 13W Photocell Fluorescent Yellow	NO		NO	Pathway illumination	NO (replace with fully-shielded fixture)
Platte River Campground Amphitheater	2 fixtures 9W Photocell Fluorescent Yellow	Partial (roof eave)		NO	Under projection booth door	NO (recessed canopy)

TOTAL RESULTS

- **Sleeping Bear Dunes National Lakeshore**

- **Total: 341 lights**

- 64 lights Fully-Shielded (18.8%)

- 277 lights not Fully-Shielded (81.2 %)



LIGHTING ZONES

Lighting Zone	Purpose	Continuity of Illumination	Allowances
NDZ	A Naturally Dark Zone (NDZ) where no permanent lighting is allowed , providing the best possible protection of natural lightscapes. Temporary artificial light limited to only where needed for human travel or work.	None.	Only small portable lighting allowed for human travel through this zone- flashlights, headlights, etc. This is the default lighting zone for undeveloped areas in parks.
LZ00	To provide an absolute minimal level of lighting for human safety, minimal disruption of natural character. Lighting is installed for discrete tasks only.	No continuity of lighting. Permanent lighting is utilized only at critical safety areas, and unlit areas predominate.	Lighting restricted to specific applications (i.e. egress lighting, steps). Preference for non-white light with good glare control and minimal brightness.
LZ0	To provide a reasonably low level of lighting for basic human safety and basic park operations , with minimal disruption of natural character.	Lighting is largely discontinuous , and within the zone there are substantial unlit areas. Some high use corridors may have continuous lighting.	Lighting is used for a variety of safety and operational needs. This is the default lighting zone for developed areas in parks.
LZ1	To provide a modest level of lighting to meet visitor expectations, safety concerns, and park operational needs in busy park environments.	Lighting is largely continuous along corridors and somewhat uniform.	Most lighting applications permitted, but at illumination levels below typical suburban or residential practices.
LZ2	For parks in urban areas and with a high ambient illumination level, but are also not adjacent to sensitive natural areas.	Lighting is generally continuous and uniform and designed to blend with surrounding urban or suburban environment.	Best lighting practices are used throughout and lighting is exemplary of night-sky friendly principles. This zone is only warranted within and adjacent to urban / suburban environments.

TOTAL RESULTS FOR LIGHTING ZONES

- Platte River District [Southern Part of Park]
 - ~LZ0
- Leelanau District [Northern Part of Park]
 - ~LZ00
 - North and South Manitou Island
 - ~NDZ

INTERPRETATION ACTIVITIES

- Star Party
- Astronomy Fest





LIGHT POLLUTION

LIGHT POLLUTION

Wildlife and ecosystems



LIGHT POLLUTION

Energy Waste
& Human
Health



LIGHT POLLUTION

Energy Waste
& Human
Health

- Melatonin
 - Circadian rhythm (body's natural clock)
 - Produced at night



NIGHT SKY HERITAGE





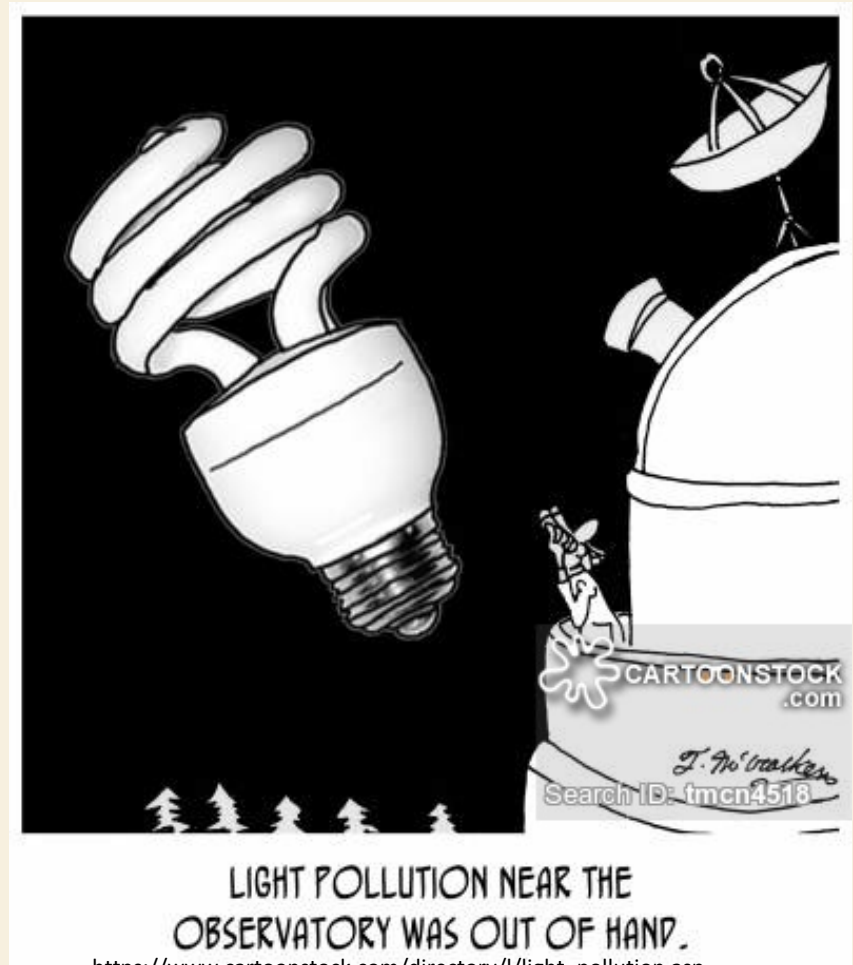
Photo: Milky Way Galaxy over NMI

Image Credit: <https://www.nps.gov/slbe/planyourvisit/exploring-dark-skies.htm>

ASTRONOMY & LIGHT POLLUTION

MCDONALD OBSERVATORY

- Dark Skies Initiative



WHY IT ALL MATTERS

NPS

- NPS recognizes the night sky as a natural resource worth preserving and protecting
- National Park refuges for darkness

SLBE

- Reducing the impact SLBE has on light pollution
- Designation of Sleeping Bear Dunes National Lakeshore Dark-Sky Park

YOU

- Involves aspects of your life

ACKNOWLEDGEMENTS

- Mosaics in Science Internship
 - Greening Youth Foundation
 - National Park Service
- Staff of Sleeping Bear Dunes National Lakeshore
 - Grand Traverse Astronomical Society
 - International Dark Sky Association
 - Kevin Skerl
 - Marie Scott
 - Lisa Griebel
 - Tim Lempke
 - Dr. Jerry Dobek





MAY THE
FOREST
BE WITH YOU

ALTNPS