

#3018



Chad Moore
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MST

To: Abra C Zobel/CAHA/NPS@NPS
cc: Margaret Carfioli/CAHA/NPS@NPS, Sandra
Hamilton/DENVER/NPS@NPS
Subject: Lighting Zones

Abra,

Here are the lighting zones we have developed. Ultimately, these will be part of servicewide guidance. But for now, lets tailor them to CAHA and its wildlife issues as needed.

Here's where you come in... getting zones established on the park GIS database. This will be a key way to communicate with other park staff and the superintendent on where we are headed. I think that simple polygons delineating developed areas would be fine. Precision is not necessary beyond 10 meter accuracy. The zones should hug the area of current and expected development, and not slosh out too much into wildlands or adjoining zones.

For starters, the default area for the park (especially the beach from the top of the dune line to the waterline) should be NDZ- Naturally Dark Zone. Then PLZ 1, 2, and 3 should be delineated on the park landscape based on expectations for artificial light, nighttime activity, and distance from sensitive wildlife areas. The attached guidance should help you do this. Piers and concessions located on the beach will interrupt the NDZ, and should be either PLZ1 or PLZ2 if warranted. PLZ 3 should be used sparingly- perhaps not even needed within the park. Once we get some of these zones on a map, we can bring the rest of the CAHA and EQD staff on board to review. If you have a working (and modern) GMP, then the delineation of zones should be linked to the existing GMP zoning, perhaps with a few exceptions like piers or remote parking lots. If the GMP isn't up to speed, then we'll have to forge out ahead of the current state of park planning to get this implemented and compliant with the USFWS Biological Opinion.

The zones will each have various lighting restrictions assigned to them to permit the necessary visibility and to protect turtles and night skies. Later we may add buffer areas, especially if there is a PLZ3 anywhere close to a NDZ/sensitive habitat area.

We've amassed a great bit of literature on sea turtles and lighting, and will soon be able to provide a balanced recommendation for lighting that hinges on the level of likely of turtle impact. This is a bigger project than we anticipated, but it is fun!



Draft Lighting Zones.doc

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"There are certain values in our landscape that ought to be sustained against destruction or impairment, though their worth cannot be expressed in money terms. They are essential to our life, liberty, and pursuit of happiness, this Nation of ours is not so rich it can afford to lose them, it is still rich enough to afford to preserve them."

Newton B. Drury
Director NPS 1940-1951

Working NPS Outdoor Lighting Guidelines Zoning

Draft 12/11/07

Developed for Cape Hatteras National Seashore Turtle Friendly Lighting Guidelines

Proposed Zones:

These proposed zones capture the most recent thinking and research regarding human visibility, illumination, wildlife impacts, and stewardship of lightscapes within national parks. It draws upon a range of knowledge bases— from the experience of the NPS Night Sky Team assessing and retrofitting lights, to research conducted by Jim Benya and Chris Monrad in low illumination environments, to the expanding volume of studies on wildlife impacts, to the data we have collected showing the sensitivity of natural park lightscapes.

Naturally Dark Zone (NDZ) There is an expectation of a natural lighting regimen and the absence of artificial light sources. No permanent light fixtures are allowed in this zone. Humans are provided the best opportunity for dark adaptation and experiencing of natural lightscapes. Nocturnal habitat is afforded maximum protection.

Examples may include: Wilderness areas, backcountry areas, sensitive wildlife habitats, beaches, stargazing sites, primitive campgrounds, and frontcountry areas with dispersed use and no facilities.

Park Lighting Zone 1 (PLZ1) No expectation of artificial lighting. Permanent artificial light fixtures may exist in isolated areas and at certain times. There is a negligible impact to human dark adaptation and experiencing of natural lightscapes. There is a presumed minimal impact to nocturnal habitat. Activities in this zone are darkness oriented.

Examples may include: Developed campgrounds, restrooms in campgrounds or isolated areas, residence areas located adjacent to sensitive habitats, parking areas with limited nighttime use, high use trailheads, interpretive kiosks, backcountry ranger stations, entrance stations closed at night, outdoor amphitheaters, rustic cabins, storage yards, and administrative facilities with infrequently nighttime activity.

Park Lighting Zone 2 (PLZ2) Expectation for artificial lighting is low. Lighting is frequently non-uniform, discontinuous/used only in specific areas, and may often be limited to specific times. There is a minimal to moderate impact to human dark adaptation and the experiencing of natural lightscapes. There is a presumed moderate impact to nocturnal habitat. Activities in this zone may occasionally require artificial light, though lighting is at a low relative brightness.

Examples may include: High use entrance stations, maintenance yards, administrative facilities with moderate nighttime activity, visitor centers, residence areas removed from visitor use areas and sensitive habitat, pathways in intensive developed zones, piers, boat

ramps, lodges, stores, restrooms (non-campground), outdoor dining areas, museums, and high asset buildings.

Park Lighting Zone 3 (PLZ3) There is an expectation for artificial lighting. Lighting is of low brightness relative to mundane lighting outside a park setting. Lighting is frequently continuous, but may also be non-uniform, discontinuous, or limited to specific times. There is a moderate to major impact to human dark adaptation and the experiencing of natural lightscapes. There is a presumed major impact to nocturnal habitat. Artificial light color rendition is frequently important. Activities in this zone regularly require artificial light, though lighting is at a low relative brightness. Most parks do not have the visitor use intensity or administrative use intensity to warrant this zone.

Examples may include: Busy entrance stations operated at night, areas of high vehicle-pedestrian conflict, busy equipment staging areas, marinas, highly congested areas, dams, and contact stations and offices within an urban setting.

Exclusions:

Temporary lighting installed less than 60 days for special (non-ongoing) purposes should be exempt. All emergency lighting should be exempt. Suggested mitigation for exempted outdoor lighting will be provided in a separate section.

Special zones for sensitive wildlife habitat and cultural/historical landscapes:

Park Lighting Zones have an alternate set of technical guidance related to two special circumstances— 1) conformance with historic character and preservation of cultural landscapes, and 2) enhancing protection of nocturnal habitat. The latter is especially important in sensitive biomes (such as beaches and wetlands) or when listed species known to be sensitive to artificial light are adjacent. Zoning guidance will refer to these as PLZx—H or PLZx—W respectively.

Buffering of Park Lighting Zones:

When PLZ 2 or PLZ3 abuts a NDZ, it is recommended to delineate a buffer zone of PLZ1 between. The PLZ1 buffer area should be of a minimum radius as defined below.

Interior PLZ	Abutting NDZ	Shall have a Minimum Radius of Intervening PLZ1 of:
Park Lighting Zone 2 (PLZ2)		<i>In development</i>
Park Lighting Zone 3 (PLZ3)		<i>In development</i>

Note in relationship to other lighting zones standards:

Though the Illuminating Engineering Society of North America (IESNA) has extended their lighting zone concept downward to Lighting Zone 0 to address lighting in parks (developed in conjunction with the joint IESNA/IDA Model Outdoor Lighting Ordinance), the breadth of development intensity in parks warrants the creation of several

zones. The specifications related to parks differs somewhat from that of the IESNA, thus we have used a separate nomenclature to avoid confusion. The creation of a different lighting zone system is intended to enhance stewardship of lightscape resources in parks, protect sensitive species, and address the agency's leadership role in sustainability and energy efficiency. For those interested in comparing the two systems, a comparison table is provided.

NPS Lighting Zone Name		IESNA/IDA Lighting Zone Name
Naturally Dark Zone (NDZ)	<i>Is equivalent to</i>	<i>none</i>
Park Lighting Zone 1 (PLZ1)	<i>Is equivalent to</i>	Lighting Zone 0 (LZ0)—though NPS standards are more stringent
Park Lighting Zone 2 (PLZ2)	<i>Is equivalent to</i>	Lighting Zone 1 (LZ1)—though NPS standards are more stringent
Park Lighting Zone 3 (PLZ3)	<i>Is equivalent to</i>	Lighting Zone 2 (LZ2)—though NPS standards are more stringent
<i>Not appropriate for parks</i>	<i>Is equivalent to</i>	Lighting Zone 3 (LZ3)
<i>Not appropriate for parks</i>	<i>Is equivalent to</i>	Lighting Zone 4 (LZ4)

For those familiar with the older CIE (Internationale de l'Eclairage) lighting zone designations, the following table provides rough equivalency:

NPS Lighting Zone Name		CIE Lighting Zone Name
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<i>Not appropriate for parks</i>	<i>Is equivalent to</i>	Zone E4

Special use artificial lighting:

When outdoor lighting is being considered for special uses that are beyond the scope of this document and are not addressed by the PLZs as articulated, separate environmental analysis should be undertaken. Discussion points will be provided in another section.

Working NPS Outdoor Lighting Guidelines Zoning

Draft 12/11/07

Developed for Cape Hatteras National Seashore Turtle Friendly Lighting Guidelines

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