



Sea Turtle Protection - The CAST Lighting Approach

Addressing the Unique Lighting Needs of Beachfront Properties Near Marine Turtle Habitats.

Introduction:

All species of Sea Turtles are recognized as either endangered or threatened. They are protected by the Federal Endangered Species Act of 1973 and various state and local statutes. Since artificial lighting may interfere with turtle egg-laying and the emergence of turtle hatchlings, many of these statutes place restrictions on lighting near turtle habitats.

The specific lighting restrictions vary among the regional statutes and, in some cases, local statutes are more restrictive than those from the state. For the purpose of this paper, we focus on Florida's Marine Turtle Protection Act (379.2431, Florida Statutes) and more specifically to their Model Lighting Ordinance (62B-55, F.A.C). This ordinance was developed as a guide for local governments in the development of their lighting statutes.

In addition, we cite the Wildlife Lighting Criteria developed by the Florida Fish and Wildlife Conservation Commission.

Understand the Language

- Shielded.** This refers to fixture construction such that light is prevented from exiting at certain angles. "Completely Shielded" is more correctly termed "Full Cutoff" (IESNA TM-15-07). It defines a fixture that does not allow any light to project in an upward direction. The model lighting ordinance also implies that even a Full Cutoff fixture may still project light onto a beach if the beach is beneath the horizontal level of the shield.
- Directly, indirectly, or cumulatively illuminated.** The ordinance uses these three terms to cover any illumination coming from light sources and reflective surfaces. It fails to recognize that all surfaces are reflective to a certain extent. It is inevitable that some illumination will spill onto the beach. Following this guideline requires a subjective assessment.

Model Lighting Ordinance

The following is a summary of the Florida model. Note that only points relevant to landscape lighting are included (standards for roadways and parking lots are omitted).

◆ Standards for new beachfront lighting

- ◆ Light fixtures shall be designed and positioned so that:
 - The point source of light or any reflective surface of the light fixture is not directly visible from the beach.
 - Areas seaward of the frontal dune are not directly, indirectly, or cumulatively illuminated.
- ◆ Exterior light fixtures within direct line-of-sight from the beach are considered appropriate if:
 - Completely shielded
 - Downlight-type, or
 - Recessed-type having low wattage (50 watts or less) bug-type bulbs, and with non-reflective interior surfaces, or
 - Other fixture types that have appropriate shields, louvers, or cut-off features
 - Mounted as low in elevation as possible through use of low-mounted wall fixtures, low bollards, and ground-level fixtures.
 - In the case of lights used expressly for safety and security, these shall be limited to the minimum number and configuration required to achieve their functional goal. The use of motion detector switches that keep these lights off (for a minimum of duration) unless approached are preferred.
- ◆ Exterior light fixtures that are not acceptable:
 - Floodlights, uplights, or spotlights that are for decorative and accent purposes only if they are directly visible from the beach or contribute towards illumination of the beach.
- ◆ Standards for existing beachfront lighting
 - Replace, eliminate, disable, modify, or reposition light fixtures to conform to standards for new beachfront lighting.
 - Add plantings or constructions to shield beach from existing light fixtures.

Wildlife Lighting Criteria

Another Florida-based organization that provides guidelines for turtle-safe lighting is the Florida Fish and Wildlife Conservation Commission. They established “Wildlife Lighting Criteria” and a certification process for lighting manufacturers.

Wildlife Lighting Criteria

Keep it low

- Fixtures must be able to be mounted as low as possible and still be appropriate for the needed purpose
- Fixtures must be able to accept lamps that produce only the lumens necessary for the needed purpose
- Bulb must produce the lowest lumens necessary for the needed purpose

Keep it shielded

- Fixture must meet or exceed full cut-off
- Fixture must be able to shield bulb, lamp, or glowing lens from the beach, wildlife corridor, or protected natural area when mounted appropriately
- Bulb must be able to be used in an approved fixture

Keep it long

- Fixture must accept long wavelength bulbs
- Bulb must produce only long wavelength light (560 nm or longer)

Do Lamps Need to be Amber or Red?

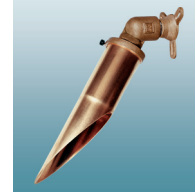
- **The Model Lighting Ordinance** places no restriction on the color of light sources and focuses, instead, on preventing all light from spilling on the beach. The only exceptions are the use of colored filters on windows that face the beach, and yellow bug lights. Since this ordinance has been adopted by many municipalities, the starting assumption is that it is not required to use amber or red landscape lighting sources.
- **Some communities and individuals** choose to select the more restrictive Wildlife Lighting Criteria. The third section of these criteria puts forth the guideline of using bulbs that produce only long wavelength light (560 nm or longer). This wavelength approximately corresponds to Amber, with longer wavelengths shifting to Red. LED's are the best source for amber and red since they emit light with sharply defined wavelengths that don't spill into lower wavelengths. It is also possible to use high quality dichroic filters for this purpose, but the efficiency of the light source is greatly reduced.

CAST Lighting Fixtures

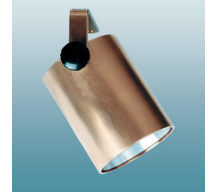
That Comply With Turtle-Safe Guidelines



CAST MR-16
Area Bullet
(CBAL1CB)



CAST MR-16
Tree Light
(CCTL1C)
(CTL1LED1)



CAST Niche Light
(CNL1CB)



CAST Small China
Hat Path Light
(CCH1CB)
(CALED2A) -
Amber



CAST Large China
Hat Path Light
(CCH2CB)
(CALED2A) -
Amber



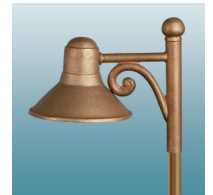
CAST New Or-
leans Path Light
(CNO1CB)
(CALED2A) -
Amber



CAST Small
Mushroom Path
Light (CMU1CB)
(CALED2A) -
Amber



CAST Large
Mushroom Path
Light (CMU2CB)
(CALED2A) -
Amber



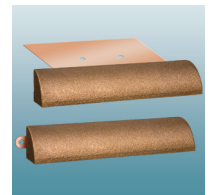
CAST Savan-
nah Path Light
(CSA1CB)
(CSWLED2A) -
Amber



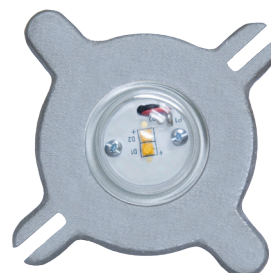
CAST Savannah
Deck Light
(CDL2CB)



CAST Deck Light
(CDL1CB,
CDL1LED1A -
Amber



CAST Engineered
Wall Light
(CEWL5(6)CB)
(CEWL5(6)LED1)



High-Performance
Amber LED Module
(CALED2A) converts
all CAST Path Lights to
turtle-safe lights

TURTLE-SAFE LIGHTING WITH CAST LIGHTING FIXTURES					
CAST Lighting Fixture Name	Model No. Incandescent	Model No. LED	Conforms to Model Lighting Ordinance	Conforms to Wildlife Lighting Criteria	Notes
CAST MR-16 Area Path Light	CBAL1CB	CBAL1CB ¹	Yes	Yes ¹	Always project in downward direction. Position fixture to prevent projection of light onto beach. Rotate shroud to achieve full shielding from beach. Note that branches, leaves, and other plant material are reflective surfaces and may cause light spill onto beach. Select lamp wattage to achieve minimum acceptable brightness.
CAST MR-16 Tree Light	CCTL1C	CTL1LED1 ¹	Yes	Yes ¹	
CAST Niche Light	CNL1CB		Yes	No (Amber and red lamps not available)	Always project in downward direction. Removal of internal reflector will reduce intensity of light reflected along outward edges of beam. Note that plant material presents reflective surfaces and may cause light spill onto beach.
CAST Small China Hat Path Light	CCH1CB	CCH1CB with CALED1A (Amber)	Yes	Yes (LED Version Only)	Note that plant material presents reflective surfaces and may cause light spill onto beach.
CAST Large China Hat Path Light	CCH2CB	CCH2CB with CALED1A	Yes	Yes (LED Version Only)	
CAST New Orleans Path Light	CNO1CB	CNO1CB with CALED1A (Amber)	Yes	Yes (LED Version Only)	
CAST Small Mushroom Path Light	CMU1CB	CMU1CB with CALED1A (Amber)	Yes	Yes (LED Version Only)	
CAST Large Mushroom Path Light	CMU2CB	CMU2CB with CALED1A (Amber)	Yes	Yes (LED Version Only)	
CAST Savannah Path Light	CSA1CB	CSA1LED1A (Amber)	Yes	Yes (LED Version Only)	
CAST Savannah Deck Light	CDL2CB		Yes	No (Amber and red lamps not available)	Wall surfaces illuminated by this fixture may reflect light onto beach. Mount fixture as low as possible.
CAST Deck Light	CDL1CB	CDL1LED1A (Amber)	Yes	Yes (LED Version Only)	
CAST Engineered Wall Light	CEWL5CB, CEWL6CB	CEWL5LED1, CEL6LED1	Yes	No (Amber and red lamps not available)	

¹Amber and red MR-16 LED lamps (suitable for landscape lighting) are available in a variety of wattages and beam spreads from Brilliance LED (www.brillianceled.com - 800.867.2108). An alternative acceptable in most communities is the use of a white incandescent MR-16 accompanied with an amber or red dichroic glass filter. Acceptable Lee Filters - Orange 9 (O59), Peach 8 (O18), Sunset 8 (O08), and Flame 9 (R99). (For more information, call Tal Kendra at 818.434.4044 - mention that CAST referred you).

REFERENCES

- **Model Lighting Ordinance for Marine Turtle Protection**, Florida Dept. of State: State Library and Archives, <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62B-55>
- **Wildlife Lighting Criteria**, Florida Fish and Wildlife Conservation Commission, http://www.myfwc.com/CONSERVATION/Conservation_LivingWith_WildlifeLighting_certProcess.htm