

A CITIZEN'S GUIDE TO IDENTIFYING AND CORRECTING PROBLEM LIGHTS ADJACENT TO SEA TURTLE NESTING BEACHES

Problem:

Light from buildings and dwellings near the beach can harm sea turtles, because it interferes with critical nocturnal behaviors. Light reaching the beach may:

1. Deter adult sea turtles from emerging from the sea to nest,
2. Interfere with an adult turtle's ability to safely return to the sea after nesting, and
3. Misdirect hatchling sea turtles emerging from the nest away from the ocean and toward potentially lethal situations.

General information on sea turtle biology and conservation can be found in the booklet "Florida's Sea Turtles", available through your local Florida Power & Light Company office. A technical reference which provides detailed information about how errant lighting disrupts the natural nocturnal behaviors of sea turtles is available from the Florida Fish and Wildlife Conservation Commission (FWC) at (561) 575-5407. Ask for the following:

Florida Marine Research Institute Technical Report TR-2, *Understanding, Assessing, and Resolving Light-Pollution Problems on Sea Turtle Nesting Beaches*, by Blair Witherington and Erik Martin. 2003.

This publication is also accessible online through FWC's web site at the following URL:
http://research.myfwc.com/features/view_article.asp?id=2156.

Sea Turtle Nesting Season:

The sea turtle nesting season, the inclusive period when the vast majority of sea turtles emerge from the sea to nest and the vast majority of hatchlings leave the nest, is defined by the FWC as May 1 through October 31 in northeast Florida.

How To Determine If A Light Is A Problem:

Lights of primary concern are those within direct line of sight of the beach. These lights have the potential for broadcasting light directly onto the beach. Light that directly illuminates the beach will typically cause problems for sea turtles. Indirect illumination of the beach by reflected light may also be a problem. Additionally, all light contributes to cumulative skyglow. Skyglow, particularly in urban areas, can create problems for sea turtles, especially on cloudy nights.

Lights that are appropriate for the coastal environment meet the following criteria:

1. The source of light (i.e. light bulb) is not directly visible from the beach.
2. The source of light does not directly or indirectly illuminate the beach.

If your property is located near the beach and you have exterior lights visible from the beach, those lights have the potential to disorient sea turtle hatchlings. Remember, a bright light mounted on a tall pole far from the beach can be just as disruptive as a less intense light on a house immediately adjacent to the beach. Follow the guidelines below to determine if lights on your property are likely to pose problems for sea turtles:

1. Plan a nighttime inspection on or near the date of the new moon (i.e., dark moonless night). This is the period when problems will be most evident.
2. View your property from numerous positions on the beach, both near the waterline and near the dune. Be sure that you walk a reasonable distance to the north and south during this evaluation. Frequently, lights that cannot be seen from the beach directly in front of your property may pose serious problems when viewed from the north or south.
3. For each light fixture that you can see from the beach, determine the following:
 - a. Can the source of light be seen (i.e. is the bulb visible)?
 - b. Are there reflective surfaces around the fixture, and if so, do they broadcast light toward the beach?
 - c. Is the light bright enough to cast a shadow from where you're standing?
 - d. How extensive is the illumination? Can you see the light from only one small area of the beach, or is the source visible from most locations? The more extensive the illumination, the more serious the problem.
4. Based on your nighttime evaluation, develop a light management plan, selecting options for each light within line of sight of the beach. The same option may be appropriate for all problem lights on your property or each light may require a different solution. Be sure that the selected options will effectively bring problem lights into compliance with the criteria set forth in any applicable lighting regulations. The intent is to confine lighting to your property and not allow it to shine out towards the beach.
5. Contact your local government or their representative for technical assistance. They can review your proposed lighting plan to assess its appropriateness and adequacy. However, ultimately the property owner is responsible for ensuring that lighting modifications meet established lighting criteria.
6. Implement your light management plan.
7. After modifications have been made, reinspect your property as in Step Nos. 1 and 2 above.
8. Make additional modifications as necessary until all lights meet established criteria.

General Guidelines for Reducing Coastal Light Pollution

In an effort to minimize overall beachfront lighting consider the following:

1. Are there any lights on your property that are unnecessary? These lights should be removed or permanently disabled.
2. Are there lights on your property that you would like to use during parts of the year but are willing to turn off during the sea turtle nesting season (May 1 through October 31 of each year)? This may be sufficient to eliminate many of your lighting problems.
3. For each area where lighting is needed, you may be able to use fewer lights to illuminate the same area without compromising convenience, safety, or security.
4. An overall reduction in wattage will not only reduce the amount of light in the coastal environment but will also reduce your energy costs.

5. Light that is directed downward will generally contribute less to cumulative skyglow than lights directed skyward.
6. Light that is directed away from the beach will cause fewer problems than lights directed toward the beach.

Specific Options For Correcting Problem Lights

A variety of options are available for correcting identified lighting problems. The effort and expense incurred during modification of existing lights will depend on the numbers of lights involved and the options selected. Remember, any costs associated with modifications may be offset by savings on electric bills.

1. Lower the fixture mounting height - Lighting criteria may be achieved by simply lowering a fixture's mounting height. This is particularly effective for single story structures near the beach, especially if there is a good dune vegetative buffer present.
2. Reposition the fixture - A light may be blocked from beach view by moving it behind a wall, post or other structure.
3. Redirect the light source - If a directional fixture is used, lighting criteria may be achieved simply by redirecting the light away from the beach.
4. Shield the fixture - A variety of pre-fabricated or custom-made shields can be applied to the seaward side of a light fixture to shield light from beach view. These shields must be securely attached and of sufficient depth and arc that light is not allowed to reach the beach. The type of shield used will vary in relation to the type of fixture, its mounting height and its proximity to the beach. Exposed light sources like floodlights can easily be fitted with hoods and directed down and/or away from the beach to bring them into compliance.
5. Change the type of fixture - Because they confine light to those areas where it is needed, directional fixtures such as downlights (see Figure 1) are much easier to bring into compliance than fixtures that allow light to escape in all directions. Downlights are ideal replacements for transparent and translucent ceiling and wall-mounted lights and may also be used along walkways. For applications that require a wider distribution of light (such as roadways or parking lots), full cutoff fixtures (see Figure 2) may be appropriate. A number of fixtures have been certified by FWC and U.S. Fish & Wildlife Service as Wildlife Lighting Approved. These fixtures when properly lamped and installed are recommended for use in areas where artificial lighting is needed adjacent to ecologically sensitive areas such as sea turtle nesting beaches. Information on these fixtures is available on the following internet web page: <http://www.myfwc.com/seaturtle/WildlifeLighting/index.htm>.
6. Recess the light source - Exposed light bulbs are much more likely to cause problems than recessed bulbs because light is broadcast in all directions. A recessed light tends to be more directional and thus better confines lighting to its intended area. This solution is particularly applicable to lights affixed to ceilings and under eaves.

7. Change the type of light source - Turtles are less sensitive to long-wavelength lights such as “true” yellow and red lights than shorter-wavelength light sources such as white incandescent, fluorescent, metal halide, and mercury vapor lights. In situations, where relatively low light levels are needed, replacement of white lights with “bug” lights or other low-intensity, long-wavelength light sources (such as Lighting Science Group Corp. R30 amber LED floodlights, www.lsgc.com; or, red LED lights) may substantially reduce the potential for lighting problems. However, if large numbers of low luminance lamps are involved, these lights should be used in combination with other options. In situations where high luminance lamps are used, low-pressure sodium-vapor (LPS) lights are an excellent substitute for standard high-pressure sodium-vapor and metal halide lamps. LPS lights emit monochromatic yellow light, one of the least disruptive types of light for sea turtles. Nevertheless, they should be used in conjunction with other light management techniques. A list of artificial light sources grouped by the level of disruption they are likely to cause sea turtles is provided by Witherington and Martin (2003, Appendix A). Information on Wildlife Lighting Approved lamps is available on FWC’s website at <http://www.myfwc.com/seaturtle/WildlifeLighting/index.htm>.
8. Add timers and motion-detectors to doorway and security lights - Some lights are essential but are only used infrequently and for brief periods. These lights should be used in conjunction with timers or motion detectors to minimize the amount of time each night that they are turned on.
9. Plant a light screen - Along areas of the beach where tall, thick vegetated dunes are present, light problems are generally minimal, because less light is able to reach the beach. Lights behind these dune buffers generally meet acceptable lighting criteria. Property owners are encouraged to plant appropriate native vegetation on or behind the dune to shield lights from beach view. However, prior to initiating this activity, you should contact the Florida Department of Environmental Protection to ensure that you have an acceptable landscaping plan and any necessary permits.
10. Combine options - Sometimes a combination of options may be required to improve site lighting. For example, a porch light consisting of a white, 75-watt bulb in a transparent, globe style fixture could be greatly improved by changing the fixture to an opaque, cylindrical fixture with a recessed 40-watt bug light.
11. Interior lights - Interior lights can create as many problems for sea turtles as exterior lights. However, these problems are easily resolved by one or more of the following options:
 - a. Move table lamps away from windows,
 - b. Use window treatments (blinds, drapes, shutters, etc.) at night, and/or
 - c. Apply a good quality window tinting.

Some examples of how lighting can be improved are provided in Figures 3 and 4.



Wall-mounted downlight with flat black interior and recessed bulb.



Close-up of wall-mounted downlight showing location of bulb (red arrow).



Pendant-style downlight with flat black interior and recessed bulb.



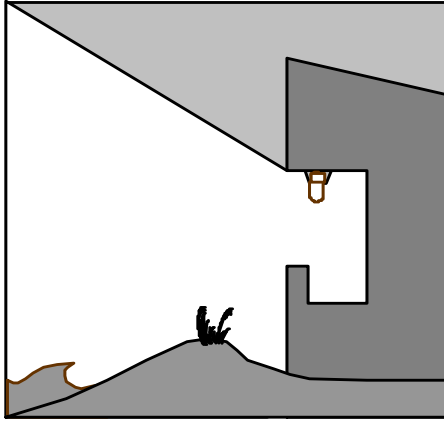
Arm-mounted downlight on pole along walkway.

Figure 1. Examples of Downlights.



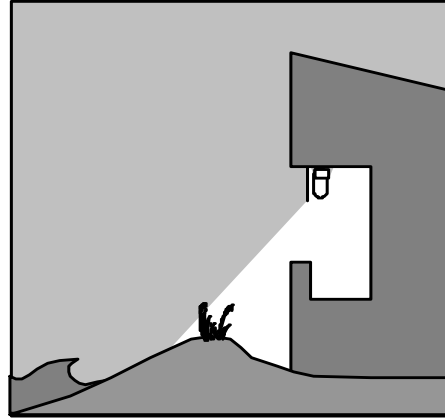
Figure 2. Examples of full cutoff fixtures. Note that in no case does the bulb or the glass lens extend below the opaque sides of the fixture.

POOR



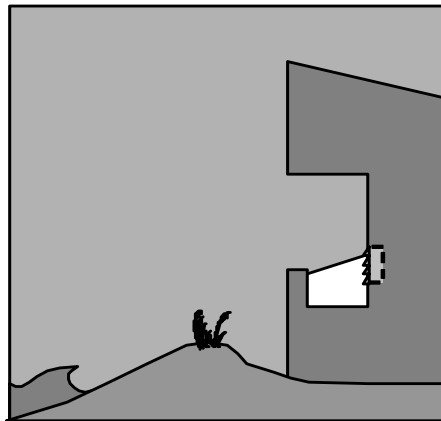
Poorly directed balcony lighting can cause problems on sea turtle nesting beaches.

BETTER



Completely shielding fixtures with a sheet of metal flashing can reduce stray light reaching the beach.

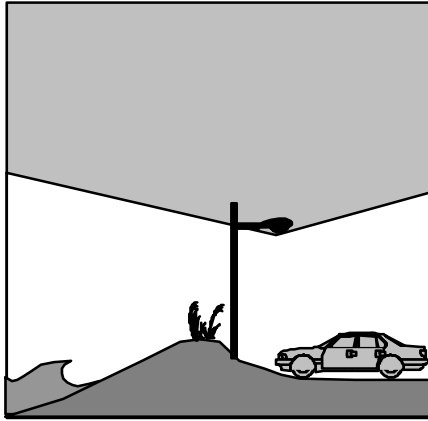
BEST



Louvered step lighting is one of the the best ways to light balconies that are visible from nesting beaches.

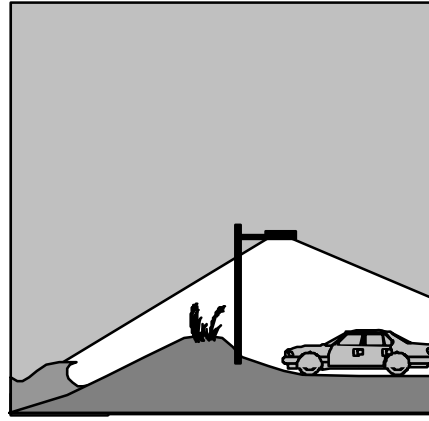
Figure 3. Examples of Different Options for Balcony or Porch Lighting
(from Witherington and Martin, 2003)

POOR



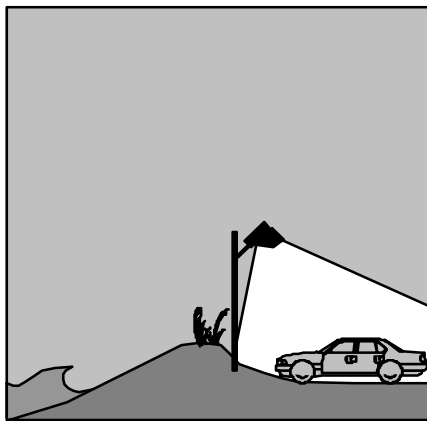
Poorly directed parking lot lighting can cause problems on sea turtle nesting beaches.

BETTER



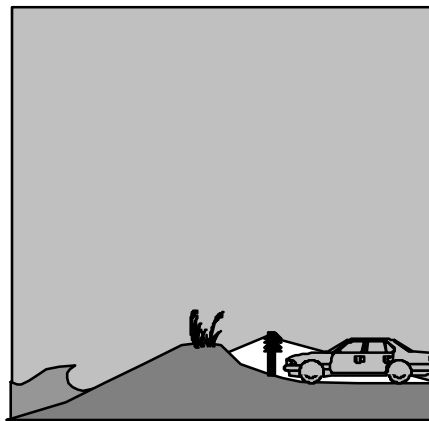
Fixtures with 90-degree cutoff angles can reduce the amount of stray light reaching the beach.

MUCH BETTER



Fully hooded floods can direct light accurately and reduce stray light even more.

BEST



Low-mounted, louvered bollard-fixtures are the best way to light parking lots near nesting beaches.

Figure 4. Examples of Different Options for Parking-Lot Lighting (from Witherington and Martin, 2003).