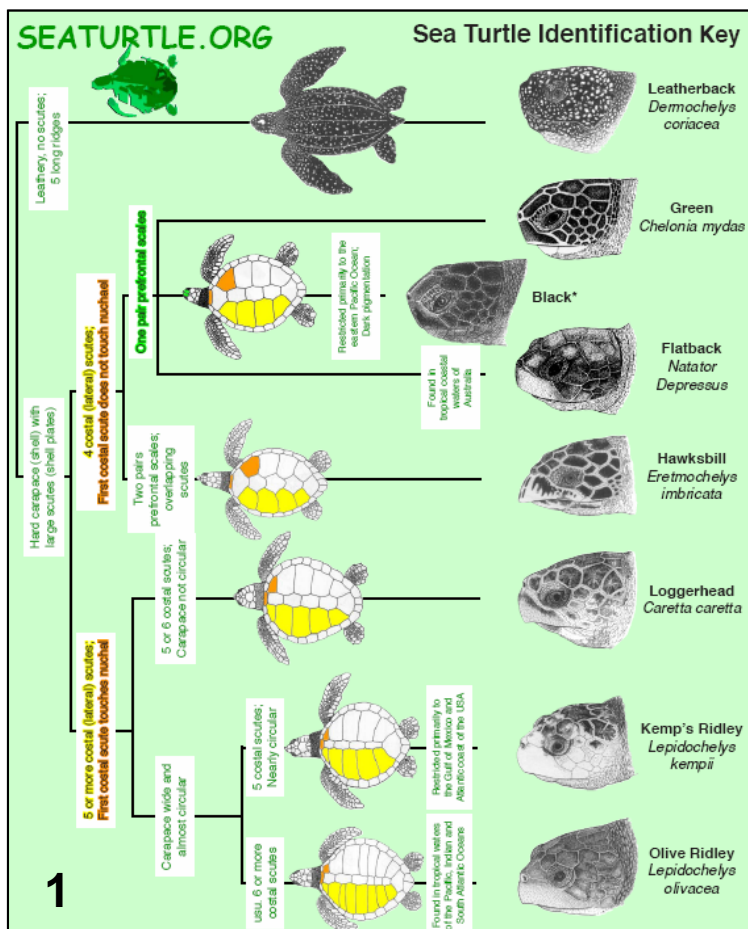




# Sea Turtle Beach Management and Protection for Coastal Developments in the Caribbean

# Nesting Biology of Sea Turtles

- Nesting Season: March to September
- Hatching Season: June to October
- Three Protected Species in Bahamas



- Loggerhead  
(*Caretta caretta*)

- Green  
(*Chelonia mydas*)

- Hawksbill  
(*Eretmochelys imbricata*)

# Nesting & Hatching

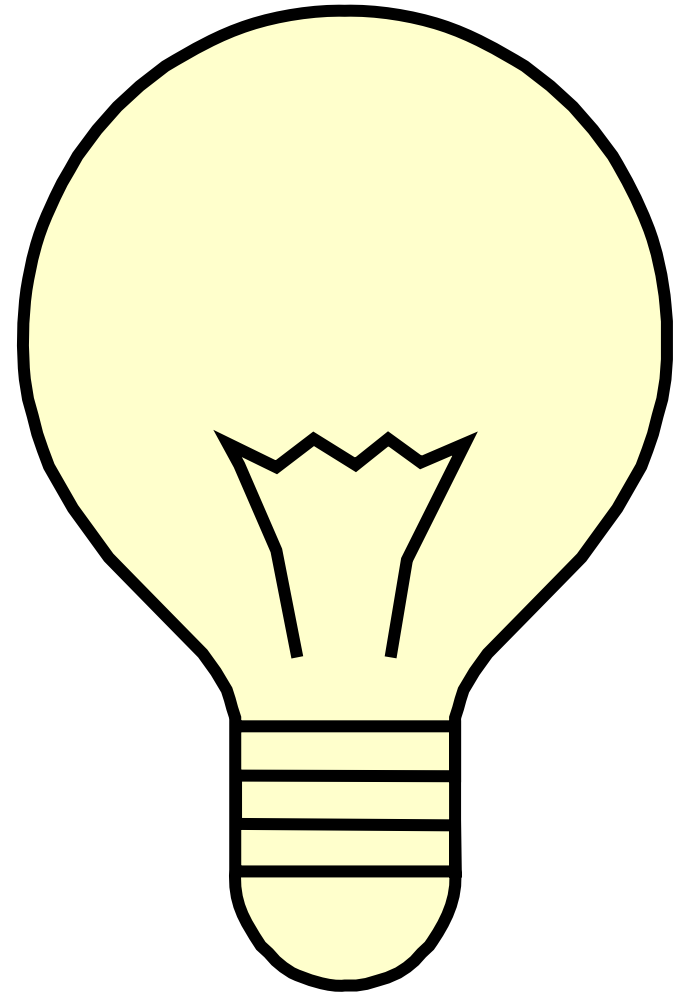
- Sea turtles typically nest at night, anytime between sunset and sunrise.
- Each female may lay up to 4 times during one season



- After the incubation time the sea turtles will hatch from their paper-like shells
- Usually occurs at night when a drop in outside temperature is sensed most of the hatchlings will emerge at once
- Hatchlings will then follow the brightest horizon to find the sea

# Visual Cues

- Studies have shown that visual cues are the major environmental stimuli used by hatchling in 'sea-finding' behavior
- Any light source is a visible cue
- Thus lights from homes, streets, and beach board walks could possibly disrupt the sea-finding behavior in hatchlings causing:
  - **Disorientation**-hatchlings lack direction and crawl in circuitous paths
  - **Misorientation**-hatchlings crawl in straight path other than the direction of the sea



# Research has shown that beach disturbances alter hatchling and adult nesting behavior

- “Simple rule: if light from an artificial source is visible to a person standing anywhere on a beach, then that light is likely to cause problems for the sea turtles that nest there.”<sup>5</sup>
- **Hatchlings** will move toward
  - Streetlights
  - Porch lights
  - Condominiums
  - Parking Lots
- **Hatchlings** then succumb to attacks by predators, exhaustion, drying by the sun, and even run over by cars on roads and parking lots
- Studies have shown that **adults** are more likely to nest on low lit beaches compared to brighter beaches.
- And lights will also cause **adult** females to disorientate

# Sea Turtles In the Abacos

The Bahamas has massive shallow banks that are believed to be the ideal foraging habitat for turtles. Hawksbill turtles are known to nest in several islands notably Abaco, Inagua, Acklins, Crooked Island and Conception Island.<sup>6</sup>



Logger head turtle spotted near the reef at “Bud’s Cave” in the Abacos<sup>7</sup>

- In The Abacos sea turtle sightings frequently occur on land and in the water.
- In the Abacos sea turtles are fished commercially.
- Surveys by University of Miami found tracks onshore and Green and Hawksbill turtles directly offshore of Great Guana Cay.

# Laws and Regulations Protecting Sea Turtles

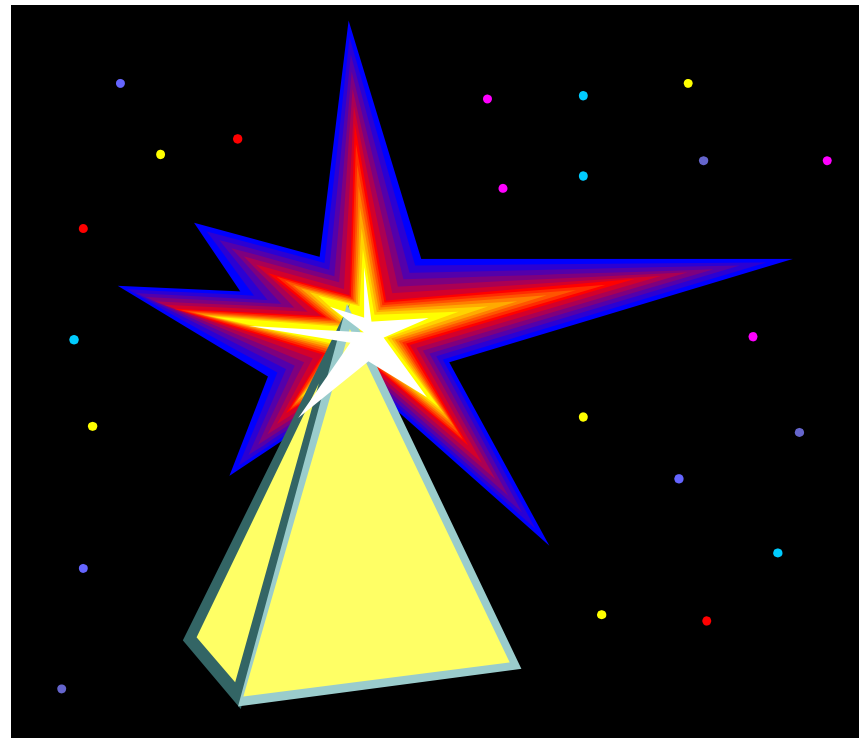
- **All Sea turtles are listed as either threatened or endangered internationally**
- **In The Bahamas Sea turtles are protected from harvesting from April 1 to July 31.**
- **In The Bahamas they are protected from trade and capture under the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) Appendix I. (CITES Appendix I includes species threatened with extinction. )**

# Lighting Alternatives

- Most marine turtles show attraction toward shorter Ultra Violet wavelengths and aversion to longer Infrared wavelengths
- Red (~650 nm) appears to be the least attractive

## Best to use:

- Low pressure sodium bulbs
- The Twistee light bulb
- Yellow bug lights
- Beeman LED (light emitting diode)

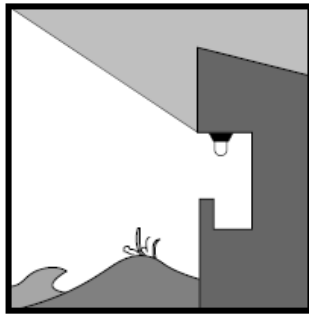




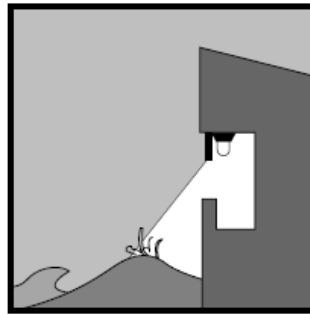
# Turtle Friendly Lighting- Guide for Coastal Lighting at Baker's Bay Club

During nesting season, artificial light on the beach should be almost undetectable, thus:

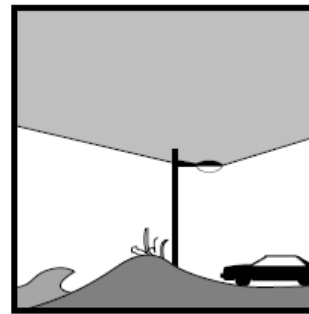
- Unnecessary coastal lights will be turned off at night
- Lights will be shielded or repositioned away from the beach
- Exposed bulbs and globe lights that scatter light will be avoided
- Shielded motion detector lighting that will only stay on for a minimum time will be used.



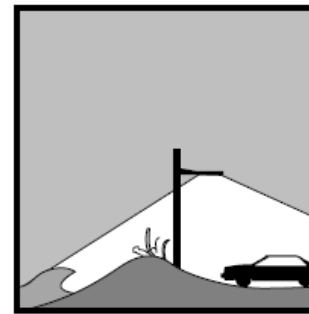
Poorly directed porch lighting



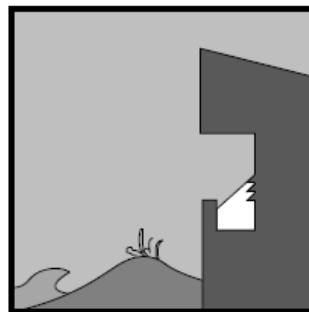
Shielding fixtures reduces stray light reaching the beach



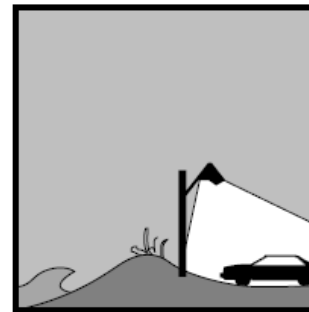
Poorly directed parking lot lighting



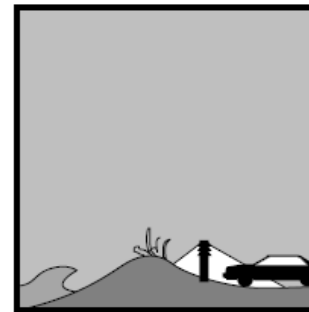
Fixtures with a sharp cutoff angle reduce the amount of stray light



Louvered "step lighting" is the best way to minimize stray porch lighting



Hooded fixtures direct light well and reduce stray light even more



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

# Case Study: Sea Turtle Protection at Baker's Bay Golf and Ocean Club

**The Sea Turtle Protection at Baker's Bay Club includes:**



- **Sea turtle habitat restoration,**
- **Sea turtle friendly lighting, and**
- **Environmentally sensitive beach maintenance**

# Dune Restoration Baker's Bay Golf and Ocean Club

Baker's Bay completed a considerable beach restoration project. These dunes were ecologically disturbed by invasive Australian pine trees and lacked topography and native coastal species.



**Before Restoration: No natural dune system & Exotic Australian Pine dominated**



**After Restoration: A natural dune system is present, key turtle-nesting habitat**

These restored habitats will provide critical areas needed for sea turtle nesting (which is often at the base of the dunes or vegetation line).

# Share the Beach- Guidelines for Beach Cleaning

## Nesting and Beach Cleaning

Sea turtle nesting habitats include all sandy beaches adjoining the waters of the Atlantic Ocean, the Gulf of Mexico, and the Straits of Florida.<sup>12</sup> At Baker's Bay, nesting habitat extends from the high tide line to the top of the dune.

Beach cleaning removes material left by the tides or beach goers on sandy shorelines. Stranded seaweed provides an important food source for beach and nearshore food chains, and should will be left in place when possible. Human debris can pose a hazard to humans and animals, and will be removed.

In order for beach cleaning to occur during nesting season, special measures will be taken to protect marine turtles, their nests and hatchlings.



**During the nesting season, Baker's Bay staff surveys the beaches in the morning. *Picture: Turtles hatching from a nest that was found and protected.***

# Share the Beach- Guidelines for Beach Cleaning

1. Cleaning should only occur seaward of the high tide line and only during the day.
2. Cleaning should only occur once an area has been surveyed for sea turtle nests.
3. Cleaning should only be done by properly trained personal.
4. All nests found should be marked and the information given to the Environmental Manager.
5. Cleaning equipment should not penetrate more than two inches into the beach surface.
6. Cleaning equipment should stay at least 10 feet from salt-tolerant vegetation.
7. In higher density areas where marking every nest is not feasible, non-mechanical methods of cleaning, such as hand raking, may be necessary.



## Additional Information can be found at:

- Bahamas National Trust-  
[www.thebahamasnationaltrust.org/](http://www.thebahamasnationaltrust.org/)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora-[www.cites.org/](http://www.cites.org/)
- Caribbean Conservation Corp- [www.cccturtle.org/](http://www.cccturtle.org/)
- The United States National Marine Fisheries Service-  
[www.nmfs.noaa.gov/pr/species/turtles/](http://www.nmfs.noaa.gov/pr/species/turtles/)
- <http://www.seaturtle.org/>

# References and Photo Citations

1. [www.seaturtle.org](http://www.seaturtle.org)
2. [www.reefnews.com/](http://www.reefnews.com/)
3. Eckert, K. L., K. A. Bjorndal, F. A. Abreu-Grobois, and M. Donnelly (Editors). 1999. *Research and Management Techniques for the Conservation of Sea Turtles*. IUCN/SSC Marine Turtle Specialist Group Publication No. 4.