



## There is a Sea Turtle on the Beach

*Top left: A giant leatherback turtle comes ashore; Top right: Leatherback hatchlings; Below: Volunteers work to save a turtle trapped by pipes*  
All photos courtesy of the Caribbean Conservation Corporation

**Ed note:** This is the fourth in a five part series on beach ecology. This month's article was submitted by Gary Appelson, STSL Advocacy Coordinator for the Caribbean Conservation Corporation, the oldest and most accomplished sea turtle organization in the world.

Florida's 825 miles of sandy beaches provide globally important nesting habitat for endangered and threatened sea turtles. Turtle nesting occurs in almost every coastal county with suitable habitat. On the state's mid-Atlantic beaches nesting densities can exceed 1000 nests per kilometer per year. Sea turtle nesting also occurs in smaller numbers on beaches from North Carolina through Georgia.

In Florida during late summer and early fall, millions of half-dollar sized sea turtle hatchlings will emerge from 40,000 to 80,000 nests laid on the dry sand of the beach. They will scramble down the beach to catch the outgoing surf. They will wander the Atlantic and the Gulf of Mexico, following oceanic currents for the next 20-30 years, before returning to the same nesting beach as mature adults. Adult female loggerhead and green sea turtles, weighing an average of 275-350 pounds, lumber out of the surf late at night to lay their nests from May to October. Giant leatherback sea turtles, weighing from 500 to over 1000 pounds and averaging six feet in length, begin emerging from the ocean as early as February. It is awe inspiring to observe these relics of the dinosaur age emerge onto a dark, quiet beach that hours before may have been buzzing with tourists and vacationers. During nesting sea turtles dig huge body pits, depositing up to 120 eggs into an egg chamber dug in the center of the pit, and then, flailing sand over their backs, they cover and disguise their nests. After about an hour of digging, laying and covering their nests, the giant turtles, breathing deeply and resting occasionally, slowly crawl back toward the ocean. The bounty of eggs and hatchlings will feed beach predators such as raccoons, crabs, and birds. The transfer of nutrients from the turtle's oceanic feeding grounds to the millions of eggs deposited on the beach plays a vital role in the ecology of the beach ecosystem. Recent findings by University of Florida researchers suggests that the eggs hold essential nutrients that strengthen vegetation along the shore and help preserve the dune system. According to sea turtle researcher Dr. Karen Bjorndal, "Sea Turtles provide a much greater quantity of nutrients to the dune system than other sources."



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But the future looks precarious at best for these giant reptiles. Almost 40% of Florida's sandy beaches are in a state of "critical erosion," due mainly to human activities. Coastal engineers in Florida estimate that up to 70% of the state's coastal erosion is a result of inlets and inlet maintenance disrupting the flow of sand along the shore. In addition people have built too close to the shoreline, drawing a line in the sand along which they battle the natural movement of the beach.

Two main engineering tactics are employed in Florida to protect upland structures from erosion. The first, coastal armoring or sea walls, will temporarily halt the erosion of sand from behind the wall. However, negative impacts to the beach/dune system can be dramatic. Sea walls often help destroy a beach, increasing erosion down beach and eliminating viable turtle nesting habitat.

The second tactic is beach fill, often called beach renourishment, which involves dredging massive volumes of sand from off shore areas and pumping it through large pipes back to a beach where bulldozers shape it into a newly engineered beach. Florida has embarked on one of the most expensive and ambitious beach rebuilding schemes in history. While it has certain advantages over coastal armoring, dredging and filling a beach has its own set of potential damaging impacts to sea turtles. Off shore dredging equipment can suck up and kill sea turtles. If the sand color is too dark or too light the sex ratio of hatchlings can be skewed since sex is determined by sand temperature. Too coarse or compacted sand can inhibit nest digging or discourage nesting altogether. Beaches that are rebuilt too wide and flat can cause turtles to nest closer to the high tide line, resulting in nests being washed out. The issues become cloudier when looking at the impacts to offshore turtle foraging habitats such as sea grass beds and near shore reefs. The effects of repetitive siltation in these sensitive habitats are inadequately addressed.

With careful planning and monitoring of beach fill projects, some specific impacts to sea turtles can be minimized. If these projects are to be employed in the never-ending and costly battle to stabilize the shifting shore, they must be carried out in the most environmentally sensitive manner possible, and cumulative impacts must be fully assessed. At the same time, local, state and the Federal agencies and elected officials must work to address the root causes of coastal erosion, while aggressively pursuing alternatives to improper coastal development and large-scale sand dredging to maintain our beaches and the important ecology they support.

MW: Moving back to individual actions, what does this mean?

G: There are three big buckets we can all think about to help move us in the right direction: Conservation, Substitution, and Humanization—better yet, let's call them Productivity, Innovation, and Better Design. Recently, conservation has taken a beating. It should not be underestimated. The current Administration has gone out of its way to say that energy conservation, for example, is not a significant plank for the future. Let's reframe that. Think of it another way: conservation should be about getting more from less. That's called increasing Productivity. Who's against that! The key here is integrating the changes that the ocean is screaming to us about. Increased "Productivity" in energy, for example more energy from much less coal applied to products that need much less energy in the first place, gets mercury out of fish and us and decreases CO2 emissions that are changing the climate. Similarly, there are many persistent compounds that we need to move away from. These are things like PCBs and CFCs. They will just keep building up and cause problems. We need to develop substitutes. Another word for that is Innovation. Who's against that! Again, we need to use the principles for working with Nature so that we don't move out of one problem and into another (e.g. out of mercury-laden coal and into plutonium-laden nuclear power waste). Finally, humanization: That means a focus on meeting human needs so that what we have is really satisfying. Call it Better Design. Who's against that! Often times we get what we want (e.g. a big powerful SUV, for example), but it comes with a lot of things we don't (e.g. air pollution and tires that end up just piling up). We need to demand the services we want and be clear about what we don't want. Again, the ocean has some clear directives for us.

So who's against higher Productivity, increased Innovation and Better Design? These are hallmarks of the American economy. Again, the key is integrating right up front the picture of success that the ocean is making clear to us. These are also things that our leaders and policy do know how to act on. It's up to us to make sure that they have all the facts about what we want, what we don't want, and what we—and our ocean and beaches—think success looks like.

MW: What about Surfrider members and the organization, specifically—are we holding our fingers in the dike, or is there a way to move consistently forward?

G: You have a great story, powerful motivation, and the facts are on your side. With the clarity of vision we are getting from the ocean, our beaches and the planet, and with clear linkages to such common, but powerful, concepts as productivity, innovation and design, it's really just a matter of making a commitment to integrating the principles for success I described and going for it. Surfrider members know all about that. It's easier to ride with the wave of our ocean and it's a lot more fun. Don't underestimate the power of your voices or your choices—look at what we have done so far. Sure, you can think of a lot of challenges to success, but there are few reasons to not try. So, go out, vote and let the ocean be a guide.