

# Keeping Sea Turtles in the Dark



Sea turtle hatchlings

## Funding boosts efforts to cut light pollution along Florida's nesting beaches

Selling darkness in the Sunshine State can be tough.

Florida's beach communities sparkle at night with homes and condominiums decked out with beautiful lighting systems. Beachside resorts and businesses depend on artificial lighting to ensure safety and entertainment for guests and customers at night.

Wherever people live, work and play, nighttime lights follow. For decades, steadily increasing illumination along Florida's coasts has wreaked havoc on sea turtles, which rely on subtle, nighttime lighting cues to deposit eggs on beaches and make it safely to sea as hatchlings.

By the early 1990s, Floridians committed to turtle conservation understood how tenuous the situation had become. Suzi Fox, director of the Anna Maria Island Turtle Watch, remembers the bad days on her island community on the Gulf of Mexico just south of Tampa.

"There wasn't one half-block area in 7 miles where you could release a hatchling and have it go to the sea," Fox said. "We didn't have any lighting ordinances back then, and people just didn't want to

turn off their lights.”

Throughout the 1990s and early 2000s, Fox and her fellow turtle conservationists chipped away at light pollution in Florida, which hosts more than 90 percent of all sea turtle nesting in the continental United States. Local governments began adopting turtle-friendly lighting ordinances, and conservation projects helped focus efforts along high-density nesting sites.

On Anna Maria Island, Fox and her group were making progress – until 2010, when the disastrous Deepwater Horizon oil spill threatened to wipe out everything they had been working toward.

“I’ve been doing sea turtle work for 30 years, and that 2010 spill dropped the bottom out of my world,” Fox said. “But I’ll tell you what – there has been a little silver lining, and it has really blossomed into something bigger.”

That silver lining emerged in the years following the spill, when sea turtle conservation groups in Florida began tapping into unprecedented conservation funding offered by the National Fish and Wildlife Foundation.

For Anna Maria Island’s sea turtles, Fox said, the difference sparked by NFWF funding “has been night and day.”

“Before that first round of funding,” Fox said, “there would be 10 disorientations in front of just one resort. Practically all of the hatchlings would go backward, year after year. They’d all wind up in a pool or out into the road and run over by cars.

“In the first year after those first projects – nothing. Everything went into the sea.”

Residents along Florida’s Gulf Coast seem to have come around, too, Fox said.

“People are learning how good it feels to do something for wildlife. They can see the difference these lighting projects makes for turtle nesting, and they can see that properties are still safe, well-lit and even more attractive at night. Just last night we had people out on the beach watching meteor showers, really enjoying the beauty of a dark beach. For many of them, it’s like they’ve come back to a place they knew and enjoyed as a child – before all the development – and they want that for their children and grandchildren, too.”

Armed with funding and the knowledge gained in such early projects, turtle experts are now steadily moving along Florida’s Panhandle, expanding the darkness as they go.

## Deadly disorientation

Sea turtles face threats to their survival from the moment they hatch out of their sandy nests to the ends of their often long lives.

Hatchlings that survive a gauntlet of land-, air- and sea-based predators must still contend with man-made threats. Fishing bycatch, loss of nesting habitat to development, boat strikes and even direct consumption of turtle meat and eggs have taken a heavy toll. Today, almost all sea turtles found in U.S. waters are federally listed as endangered; the loggerhead is listed as threatened.

Of all the man-made threats to sea turtles, artificial lighting near nesting beaches may be the most widespread and onerous, affecting both nesting females and legions of hatchlings.

“The exact number of hatchlings who are disoriented and die every year in Florida is unknown, but it’s probably well over 100,000,” said David Godfrey, executive director of the Florida-based Sea Turtle Conservancy. “When they pop out of an egg in a dark nest, their very first instinctive drive is to make it to the water and swim out as far as they can. In that moment, they’re relying a little bit on the slope of the beach – they instinctively know to go downward – but they’re relying even more on light. The visual cue they would typically use, the horizon out over the ocean, is always just a bit brighter, because of starlight and moonlight.”

Even a single bright light near a nesting site can cause all of the hatchlings on a given beach, or most of them, to head inland, Godfrey said.

“They’ve got a finite amount of energy when they hatch, which they desperately need to get to the water and swim out to safety. When they get disoriented like that, they expend all of that energy scrambling around looking for the ocean. They become very vulnerable to predation, to dehydration, to being cooked in the sun, to being crushed by cars.”

Artificial lights near nesting beaches also threaten adult female sea turtles hauling out to nest.

As they’re approaching a beach from the sea, these females instinctively seek out dark places to deposit their eggs. Bright lights can deter females from coming ashore at all. If they come ashore despite the lights, they can be lured away from the sea.

Evidence of sea turtle disorientation along Florida’s Atlantic and Gulf coasts can be heart-rending and grisly. Hatchlings often leave confused, zig-zagging tracks in the sand before heading inland to be crushed on a nearby roadway. Gigantic adult females sometimes wind up in a resort’s swimming pool, or under the wheels of a vehicle.

## Expanding the darkness

Throughout its history, NFWF has worked to bolster sea turtle numbers and maximize conservation investments by awarding competitive grants to a range of organizations operating in southeastern and Gulf Coast states, as well as in nearby countries where sea turtles migrate. NFWF-funded projects have focused on habitat restoration, nest relocations, predator control, bycatch avoidance and public outreach.

In 2009, NFWF launched a 10-year strategy to guide conservation investments that measurably improve the recovery of seven sea turtle populations in the Western Hemisphere: leatherbacks, Kemp’s ridleys, loggerheads, and hawksbills in the Northwest Atlantic; and leatherbacks, loggerheads and hawksbills in the Eastern Pacific.

Various projects by groups with funding from NFWF have increased the productivity of more than 100 miles of priority nesting beaches, allowing hundreds of thousands of new hatchlings to make it to the sea. Additionally, in-water efforts to implement safer fishing gear practices reduced sea turtle bycatch 50-100 percent in the United States and some neighboring countries, saving thousands of turtles each year.

NFWF-funded projects focus on all aspects of the turtle life cycle, from nesting beaches to in-water interactions with fisheries, but there are other important pieces in the conservation puzzle. Many other conservation teams both large and small are working to increase the available science, educate the public on key issues and improve management of these threatened and endangered species.

The cumulative effects of all sea turtle conservation efforts made headlines when scientists announced record-breaking numbers of nests at many Southeast beaches. The news was especially good for green sea turtles, which were in serious jeopardy just 20 years ago when only 455 nests were recorded in the Archie Carr refuge on Florida's Atlantic coast. After significant conservation efforts and management protection, this population is recovering its former numbers, with 12,026 green turtle nests counted at the Archie Carr refuge in 2015.

Ramped-up conservation efforts following the Deepwater Oil Spill are expected to multiply these successes by giving increasing numbers of turtles even better nesting habitats. In quick action following the 2010 disaster, NFWF established the Recovered Oil Fund for Wildlife to help protect endangered sea turtles and thousands of migratory birds. One project involved the relocation of turtle eggs directly threatened by oil washing ashore.

Local turtle experts and NFWF staffers established key focal areas for conservation efforts that would mitigate the damage to turtles caused by the oil spill. At the top of the list: eliminating light pollution along nesting beaches.

"We knew sea turtles were being disoriented, and we had good evidence and guidance from researchers on what could be done with lighting," Godfrey said. "There were a variety of products already on the market, amber or red LEDs for example, that had already been reviewed and approved by state researchers as turtle-friendly lighting."

In addition to implementing conservation projects on a massive scale, new funding offered the opportunity to do something unprecedented in Florida, Godfrey said. Investments by various entities, including state and federal agencies and the spill-related Natural Resource Damages Trustees, had helped dim the lights at beaches along public lands. But, Godfrey said, there had never been a large, focused effort to help private property owners convert their lights.

"This was the first time that a pool of money was available for various groups to go out, meet with property owners, show them evidence of problem lights, show them the types of lights that would fix it, and then tell them that we're going to help them pay for it. All they had to do was let us do it. It was a really unique position to be in, helping big condos or resorts or businesses cover that expense, and providing the guidance to do it right."

These early projects, Godfrey said, provided ample evidence of success.

"Turtles were disorienting less, the lights last longer, and the people who live there actually like it. There's no security issue, and they're saving tons of money on exterior lighting bills. That first shot of funding showed that turtle-friendly light management is effective, it works, people like it, and the turtles respond the way we hoped they would."

On Anna Maria Island, Fox's group also found success. The group retrofitted commercial and residential private properties with lower-frequency, turtle-friendly lighting. New research into the

latest technologies – LEDs, light shields and other technologies and techniques – helped establish the most cost-effective practices for property owners to comply with nighttime lighting ordinances.

Working on private properties was key, Fox said, as homes often outnumber businesses along the state’s Gulf Coast. Before those projects began, she added, property owners thought they’d have to pay thousands of dollars to comply with lighting ordinances.

“Once it was established that only a couple hundred bucks could make a huge difference, people were knocking down our door. People started to change their own properties, even without grant funding, to match their neighbors.”

And now, after decades of NFWF-funded conservation work and the recent funding boosts, Fox’s group and others like it around Florida are reporting incredible progress in addressing nighttime disorientations, one of the most daunting man-made threats to sea turtles. When Fox and local codes enforcement officers look over Anna Maria Island’s beaches at night, they’re astonished at how far they’ve come.

“In between the grant-funded buildings, everybody else has come into compliance,” she said. “Now we have blocks, whole cities, with turtle-friendly lighting.”