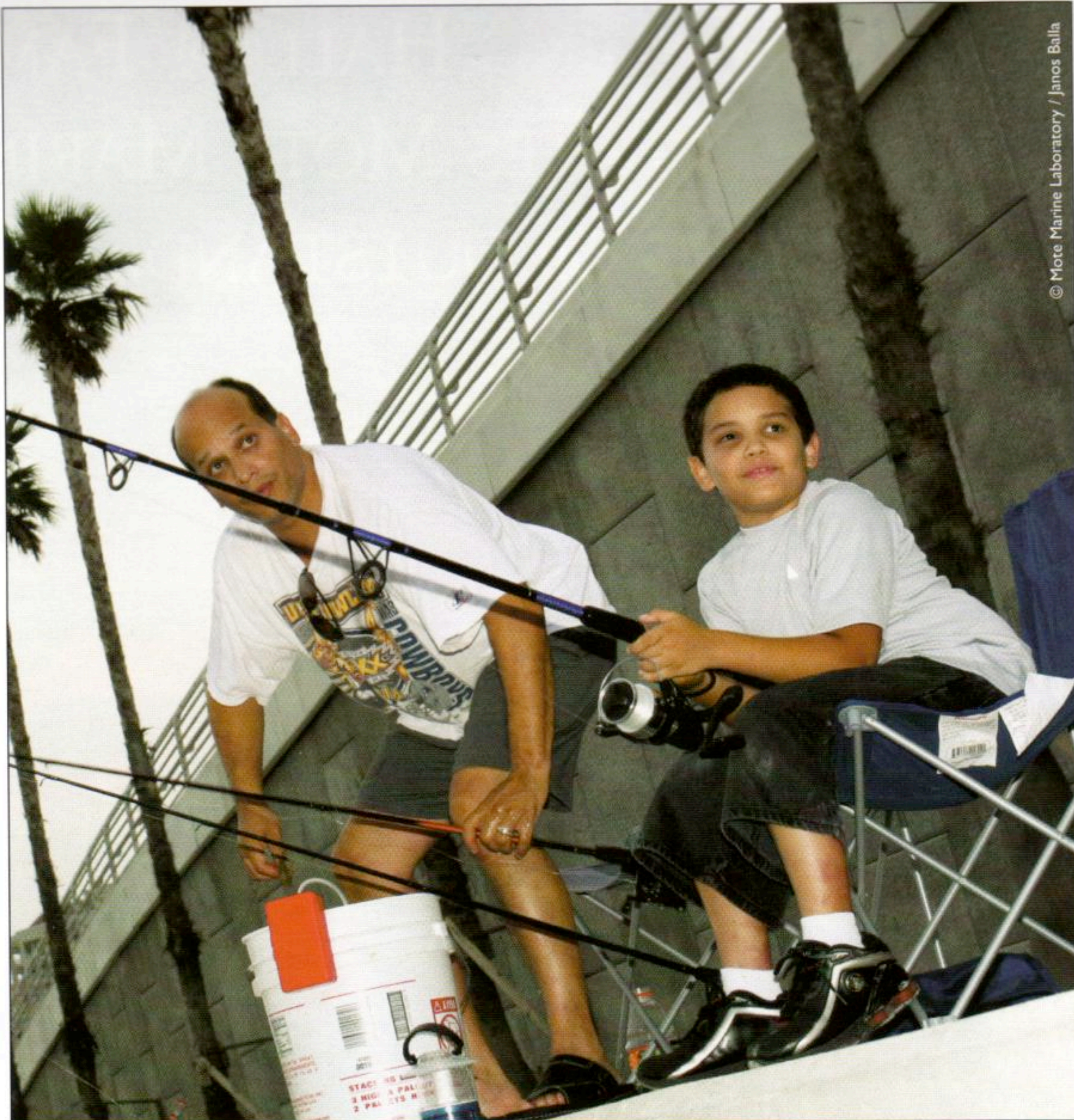


# Stocking UP for the Future



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by Adam Voiland

Rain threatened on a warm July evening in Sarasota, but Elijah Espada, 9, and his dad, Franco, 42, showed no signs of moving. Fishing on a pier, Elijah hooked a 5 pound redfish and the father-son team was hoping for more. Franco Espada has been saltwater fishing for 20 years. "It's therapeutic. Fishing allows me to get away from life for a little while," he said. "But, also, it's exciting. In the ocean there's quite an element of surprise."

One of Espada's favorite fish to catch is snook. "They're great fighters," Espada said. "But I've seen a lot of guys fishing for snook who have to catch-and-release because of the regulations."

Espada is referring to stringent rules that limit Florida anglers in the Gulf of Mexico to catching only one 26-to-34-inch snook per day during a limited season. "I've heard people complain. The regulations are frustrating for people who want to eat what they catch," he said.

Recreational fishing injects some \$5.4 billion annually into Florida's economy, a number that rivals citrus production in value. But due to fishing and coastal development pres-

ures, populations of prized game species such as snook are dwindling. That's why replenishing wild fish stocks with hatchery-raised fish is an alluring idea for many. But stocking poses significant technical challenges, and some scientists warn that meddling with the ecosystem will cause irreparable harm. Given the high stakes, it's hardly surprising that Mote's Center for Fisheries Enhancement is focused on the scientific study of restocking efforts.

"It's a highly political issue," said Dr. Kenneth Leber, director of Mote's Center for Fisheries Enhancement. "It's very controversial because, in the past, some of the stocking programs have been pretty irresponsible."

Mote's position on enhancement is simple: Tag, tag and tag. And then decide if stocking works. "The biggest mistake people make is asking how many fish were put out rather than asking how many fish were added to a fishery," Leber said.

Every snook released by Mote is tagged with a coded wire tag that allows researchers to see if hatchery fish are actually contributing to the local snook fishery. Mote also partners with Florida's Fish and Wildlife Research Institute in a project to track the progress of hatchery raised red drum, also called redfish.



## THE STORM AROUND STOCKING

Much of Florida's fishing public — as well as many of its politicians — are chomping at the bit to see the state catch up with Texas, which has a massive stocking program in comparison to Florida. "Texas has made a complete fool of us," says Karl Wickstrom, the editor of *Florida Sportsman* magazine and a powerful advocate of stock enhancement. "Last year the state of Florida put out 8 million redfish. Guess how many Texas put out? Thirty million!"

But this stock-now-ask-questions-later mentality infuriates people like Dr. Ray Hilborn, a vocal critic of stock enhancement and a professor of fisheries science at the University of Washington. "Marine stock enhancement is still pretty much cowboy country," Hilborn said.

Scientists like Hilborn point out that marine stock enhancement, as opposed to the more established field of freshwater stock enhancement, is a new field fraught with uncertainty. Those against releasing hatchery-reared fish in marine waters oppose stock enhancement for a variety of reasons. Some worry that marine ecosystems can't absorb additional fish, especially large predators like snook. Others claim stock enhancement is a waste of money that could be better spent on habitat restoration. Still others are concerned that hatchery-raised fish will outcompete and displace wild stocks or introduce disease and change the gene pool.

One of the central debates revolves around a principal of ecology called "density dependence" that says as a population becomes denser, the growth of the population tends to decrease. This happens because members of the population face increasing competition for food and refuge space. With more competition, individuals are forced to forage further for food, which makes them vulnerable to predators.

"Density dependence is subtle," says Hilborn. "What we're asking is how many fish have died. It's hard to see that."

## BRINGING SCIENCE TO THE DEBATE

Leber is determined to bring scientific rigor and candor to the debate in Florida. "We're using science to test density dependence for snook," he said. The idea is to use new technologies to answer questions about marine restocking efforts once and for all. Even critics like Hilborn — who has come to Mote to talk about stocking issues — admit that science's understanding of marine stocking is much less developed than it is for freshwater species and he calls Leber's approach very reasonable.

Dr. Carl Walters of the University of British Columbia, who has also been critical of marine restocking efforts, has come to Mote to study density dependence with the center's researchers. Although Leber and Walters don't see eye to eye on every single scientific issue, both are thrilled that Mote's snook research and the redfish project will inject scientific data into the debate.

"I think it is hard to believe that using aquacultured animals and stocking them is something that's going to go away," said Leber. "I don't think we're going to find that this is having such a terrible impact that we've got to stop. I think it's going to be increasingly relied upon. But stock enhancement is not a panacea and we're not looking at it as one. We know there are a variety of reasons that fish populations decline and ultimately disappear. Just raising them in the hatchery and putting them in the water is not going to solve all the problems."

## FISHING OUT THE UNCERTAINTIES

The scientists studying stock enhancement at Mote are the first to acknowledge that they must resolve significant uncertainties before stock enhancement is integrated into ocean management on a large scale. Dr. Kevan Main, the director of Mote's Center for Aquaculture Research and Development explains: "We still don't really know how to grow snook. Marine fish have more complex life stages, go through a longer larval stage, and often require multiple types of live food. On top of that, the actual stocking is considerably more complicated in the ocean because the system is so much bigger. It's much easier to figure out what sort of impact you're having on a closed body of water, like a lake, than on the open ocean."

In order to do a proper study, Leber would like to release at least 100,000 snook each year. So far, the most Mote has been able to produce is about 20,000. The bottleneck is due to a variety of hiccups such as excessive cannibalism among juveniles, difficulties harvesting eggs to culture and identifying the ideal foods for small larval snook.

Main is optimistic, however, about a new line of research that involves capturing wild snook, bringing them to the lab and using artificial lights to trick them into spawning in captivity. Currently, she relies on teams of biologists and interns to harvest wild eggs from creeks around Sarasota. "It's a laborious and expensive process," and in recent years, weather has damaged

some of her premier sampling sites, making it difficult to get enough eggs, she said.

Since 1997, Mote has released some 50,000 juvenile snook into the sea. So far, the results have been promising, according to Leber. During the 2000, 2001, 2002 and 2003 annual Snook Foundation fishing tournament, which is designed to help Leber's center measure its efforts, some 4 percent of the fish caught came from the Mote hatchery. And in 2004, a fisherman bagged a 34-inch hatchery-raised snook — the largest ever caught. It demonstrated that hatchery-raised snook can prosper in the wild.

Meanwhile, Mote's partners at the Florida Fish and Wildlife Research Institute have managed to create a small red drum fishery in Biscayne Bay and are in the process of experimentally stocking Tampa Bay. Preliminary data suggest that hatchery fish don't necessarily displace wild fish as some critics claim. Leber's team has also made considerable progress in determining what size juveniles and what stocking locations result in the highest survivorship. "The jury's still out," he said. "But we're starting to accumulate data that other scientists and regulators are responding to and getting excited about," he said.

## THE FUTURE

Whether snook stocking proves viable or not, Leber's primary goal is to change the way the public and policy makers understand the science of stock enhancement. According to Leber, enhancement isn't about hook-happy fishermen indiscriminately dumping buckets of eggs into the surf and hoping for the best. It's about understanding the ecosystem and targeting appropriate populations that rigorous scientific research shows could recover with a slight boost.

And though stock enhancement is primarily focused on large species of interest to anglers, ultimately Leber believes the technology and expertise developed will benefit endangered stocks in the future. "One of the major reasons I have such a passion for this field is that we're going to need this technology to protect endangered species," he said. "If we restore some habitats, but there aren't enough animals around to utilize them, then it could take decades, if not centuries, to get them back without stock enhancement." ■