



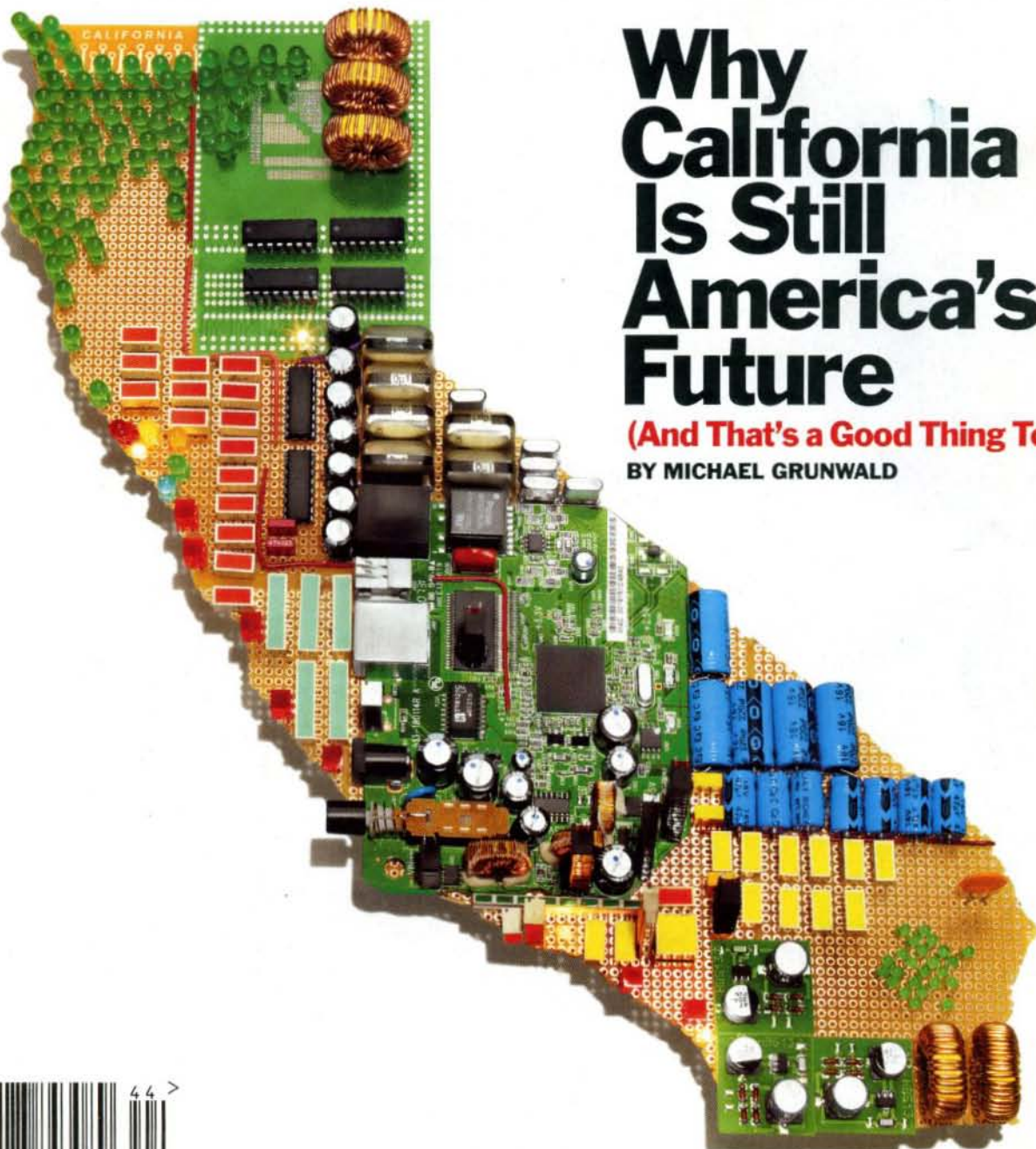
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Invasion: Jellyfish
Swarm the
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TIME



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(And That's a Good Thing Too)

BY MICHAEL GRUNWALD

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ENVIRONMENT

A Gelatinous Invasion.

How a species of thumb-size jellyfish is threatening to upset the Mediterranean ecosystem



Trouble at sea *The Mnemiopsis thrives in waters that have been overfished*

BY STEPHAN FARIS/ROME

THE JELLYFISH IN THE PHOTOS didn't look like they'd pose a danger to swimmers. Thinly veined and translucent, they didn't have stinging tentacles trailing behind them or dramatic colors signaling danger. But Ferdinando Boero, a professor of zoology at the University of Salento in Italy, knew that they meant trouble nonetheless.

The pictures, sent by a biologist in the northern Italian town of Lerici in July, marked the first time the species *Mnemiopsis leidyi*, a thumb-size jellyfish known as the sea walnut, had been documented in the western Mediterranean Sea. Native to the Atlantic coast of the U.S., *Mnemiopsis* was introduced to the Black Sea in the 1980s—most likely from the ballast water of oil tankers—and played an instrumental role in the collapse of the region's fisheries. "Now

the question is, Will it do in the Mediterranean the same thing it did in the Black Sea?" Boero says. "It's harmless for [humans], but it can be deadly for the fish."

The ominous discovery—the result of Boero's request that all Italians report their jellyfish sightings—came during a series of unusually prolific jellyfish seasons over the past five years. This summer, jellyfish outbreaks forced numerous resorts along the Mediterranean coast to shut their beaches. In Corsica and Tuscany, several swimmers were wounded by Portuguese man-of-wars, jellyfish-like creatures with a potentially fatal sting. In Tunisia, a swarm of jellyfish engulfed a fish farm, killing the year's production of sea bass and sea bream.

Off the coast of Israel, where tropical species have moved in through the Suez Canal, jellyfish floated in

AN AQUATIC SWARM



● *Mnemiopsis* sightings along the Italian coast between May and September

swarms more than 100 km long and 2 km wide. Blooms of *Mnemiopsis*, first documented off Israel last winter, clogged the filters of a desalination plant that supplies coastal communities with 100 million liters of water a day. At the height of the outbreak, water production at the plant dropped by more than a third as desperate workers tried to clear the filters.

The reasons for the recent explosion in jellyfish numbers are many. The problems in the Black Sea occurred because *Mnemiopsis* had been introduced to an ecosystem that had already been severely overfished. In a healthy ecosystem, small fish keep the jellyfish population in check by eating their young. But when the fish population plummets, the tables are turned. By preying on the eggs and larvae of the few surviving fish, the jellyfish prevent them from replenishing their numbers and quickly take their place. "We're shifting from a fish to a jellyfish ocean," says Boero. "We're removing most of the fish, and nature doesn't like a vacuum."

But overfishing is not solely to blame. The nutrients from fertilizer runoff and sewage suck oxygen from the lower layers of the ocean, creating an environment in which fish struggle but jellyfish thrive. Since 2000, there's been such an increase in numbers of Australian jellyfish in the oxygen-depleted waters of the Gulf of Mexico that shrimpers have been forced to

hang up their nets during the swarm season in the summer. In the nutrient-rich waters off the coast of Japan, where jellyfish can grow to the size of refrigerators, a nuclear power plant was forced to lower production in 2006 when a mass of the creatures clogged its cooling system.

Climate change, too, is likely playing a role. As ocean temperatures rise, jellyfish are reproducing faster, and tropical species are beginning to extend their range. "It could be a big economic problem for countries like Australia," says Anthony Richardson, a marine biologist at the University of Queensland in Australia. If the deadly box jellyfish that plague the country's northern beaches migrate south to the Gold Coast, it could have huge implications for the region's multibillion-dollar tourism industry.

Once a body of water becomes infested with jellyfish, it's not so easy to engineer a recovery. The Black Sea has begun to recuperate, but only after a convergence of several unlikely occurrences: many of the region's fisheries shut down when their stocks fell, the breakup of the Soviet Union sharply cut the amount of fertilizer in the sea, and another alien jellyfish, the *Beroe ovata*, which preys on the *Mnemiopsis*, not fish, was accidentally introduced to the water. "It's taken three separate events," Richardson says. "The point is you can't just stop overfishing and expect the fish to come back."

To be sure, the Mediterranean's ecosystem is more diverse—and thus more robust—than the Black Sea's. So only time will tell what kind of effect the *Mnemiopsis* will have. "What these jellyfish are eating are either the young of the next generation or the food of the next generation," says Bella Galil, a scientist at the National Institute of Oceanography in Israel. "We'll know the impact when what they ate does not appear in the nets next year." ■