

~ 4 ~

The Wetlands & the Weather

ILLOGICALLY, THE HEART of climatology research in the United States, including hurricane research, is at Colorado State University in land-locked Fort Collins. There, a meteorology professor named Roger Pielke Sr. juggles his graduate students, his contributions to scientific journals, and his role as the state of Colorado's climatologist as he patiently tries to explain his views on global warming to journalists. But that story comes later.

Pielke began his career with the National Oceanic and Atmospheric Administration's Experimental Meteorology Lab in Miami, where in the early 1970s he worked on a government cloud-seeding project. Pielke's job was to develop a model of Florida's weather that NOAA could use to figure out if its cloud-seeding experiments were increasing rainfall. (They were not.) While the feds' foray into weather modification failed, Pielke continued to build upon his model. Fifteen years ago, he consolidated it with another developed by colleagues at Colorado State. They called the combined tool the Regional Atmospheric Modeling System, or RAMS.

In 2004, Pielke and his colleagues published two journal articles based on RAMS that drew this remarkable conclusion: by changing the land in Florida, people were changing local climates. Massive drainage of

M I R A G E

wetlands in particular, they found, could lead to decreased rainfall in the summers and more-severe freezes in the winters.¹ As they dried up the land, Floridians dried up the rain.

Deb Willard is a paleobotanist with the U.S. Geological Survey, but you might think of her as a nature detective. She created pre-1900 land-cover maps of South Florida using centuries-old clues such as pollen trapped in layers of soil. The scientists fed those maps, along with modern-day land-cover data from NASA's Landsat 5 satellite, into RAMS. That let them generate weather patterns for particular dates using either current or historic land cover.²

To study summer rain and heat, the team ran simulations for three separate summer-time dates. In each case, it found that when averaged across South Florida, modeled rainfall was 10 percent to 12 percent less when current land conditions replaced the pre-1900s natural vegetation. Temperatures were affected as well. Urbanization hiked maximum daily temperatures by several degrees, particularly around Miami and Fort Lauderdale. The thermometer climbed highest in the center of the peninsula, where daytime highs were up to four degrees Celsius warmer under the present-day land conditions. The scientists checked their simulations against actual summer-time rainfall data available from South Florida stations between 1924 and 2000. Though the station data were limited, those, too, revealed an average rainfall decrease of 12 percent over the seventy-five-year period.³

Pielke and his coauthors, Curtis H. Marshall of NOAA and Louis T. Steyaert of NASA, traced the changing rainfall patterns to drainage of the Kissimmee River basin floodplain. Inundated with water prior to 1900, the basin would have provided more moisture as fuel for Florida's summertime showers. Without the water, the showers were weakened over the state's interior.⁴

If the rain drying up were not bad news enough, Pielke and his colleagues next turned their attention to freezes. Using the pair of land-cover maps, the scientists honed in on a January 1997 freeze that had not been predicted and severely damaged South Florida's winter vegetable and citrus crops. They simulated the freeze with both data sets and found that under the pre-1900s natural land cover, "a persistent heat flux from wetlands was sufficient to hold the simulated temperature above freezing throughout the night."⁵ Under current land cover, the simulation produced minimum temperatures that were both colder and below freezing

The Wetlands and the Weather

for longer periods—particularly in areas to the south and southwest of Lake Okeechobee that had been drained for high-density cultivation of winter vegetables, sugarcane, and citrus.⁶

The study offers an answer to the long-troubling question of why freezes seem to chase Florida's citrus farmers. The state's citrus industry started in the nineteenth century in northeast Florida around Jacksonville. Deadly freezes kept farmers relocating farther and farther south, from their heyday along Central Florida's Indian River ridge in the mid-twentieth century to their current concentration in the counties around Lake Okeechobee. Ironically, says Pielke, when farmers drain wetlands for crops, they increase the likelihood that freezes will harm those very crops.

Florida's own climatologist is a white-bearded Santa look-alike named James O'Brien. He is an expert in the weather phenomenon El Niño, the name of a warm ocean current that appears irregularly off the north Peruvian coast and causes weather aberrations throughout the world, particularly in Florida. (El Niño is a good thing for Florida because its winds weaken hurricanes.) O'Brien wears bolo ties and loves bass fishing. He has a mildly annoying trait that gives him away as one of those most hardcore of bass fishermen. He will not reveal where he caught certain lunkers pictured on the walls of his office in a sprawling research park south of Tallahassee. "That one came from a large lake north of Orlando," he demurs. "That's as much as I can say."

There is one point on which O'Brien does not demur. Pielke, he says, is right that wetlands drainage is changing local weather. Scientists have long noted the worldwide "heat-island" phenomenon. Urban and suburban areas stay 2 to 10 degrees Fahrenheit hotter than nearby rural areas. The reasons: more asphalt, less water and shade, and other heat generators like car exhaust. A similar phenomenon affects rainfall. Crunching a century of precipitation data on his computers at Florida State University's Center for Ocean-Atmospheric Prediction Studies, O'Brien creates charts from cities throughout the peninsula that reveal a clear pattern: cities that have been drained for agriculture or development show steady rainfall deficits. Fort Lauderdale's deficits, for example, begin right around the population boom of 1950. On the other hand, the relatively undeveloped shrimping community of Fernandina Beach, also on the east coast, shows a steady surplus of rainfall for the same period. Chart after chart show steep deficits correlated with intense development, sur-

M I R A G E

pluses for slow-growing communities. The deficits in Brooksville and other areas north of Tampa begin in the late 1970s and early 1980s, when they were drained for ranchettes. Ocala's decline begins in the early 1990s, when the region's thoroughbred horse farms began to be plowed under for subdivisions. In contrast, slow-growing towns in the panhandle such as Madison and Monticello see a slight surplus. The surplus rainfall pattern would have held statewide, says O'Brien, had it not been for land-use changes.⁷

T H E R I S I N G S E A S

Local climate change is different from global warming, the gradual rise in the Earth's average surface temperature. But in the politically charged debate over global warming, Pielke was branded a skeptic because of his assertions that changes in the land, like wetlands drainage, deforestation, and urbanization, are at least as important as increases in atmospheric greenhouse gases. Pielke says he is misunderstood. "Of course the climate is changing," he says. "I'm simply not convinced that carbon dioxide is the worst problem."⁸

In the weird political landscape of early twenty-first-century America, scientists were enormously frustrated that global warming was becoming, like evolution, a matter of public opinion. "People decide whether they believe it or not . . . in spite of the scientific evidence," complained Judith Curry, chairwoman of Georgia Tech's School of Earth and Atmospheric Sciences.⁹

From the National Academy of Sciences, the fact is this: average global surface temperature has climbed about one degree Fahrenheit in the past century, with accelerated warming over the past two decades. The evidence is increasingly strong that people are to blame for most of the recent warming. Pollution from smokestacks and tailpipes changed the chemical composition of the atmosphere by building up heat-trapping greenhouse gases—primarily carbon dioxide, methane, and nitrous oxide. As a result, in North America over the next century or so, we will see warmer temperatures, increased drought, and sea-level rise.¹⁰

The big question for Florida and the eastern seaboard, of course, is this: just how high will the oceans creep? William H. Schlesinger is a professor of biogeochemistry and dean of the Nicholas School of the Environment and Earth Science at Duke University in North Carolina. But

The Wetlands and the Weather

lately, he's been riding the Sunday morning circuits like a traveling preacher. Church congregations around the Tar Heel State have invited Schlesinger to speak about global warming and its impacts on the southeastern United States. The audiences are self-selected, he admits. "I think those who believe humans should subdue the Earth leave after service and don't stick around for my lecture," he says.¹¹ At the national level, evangelical Christians between 2004 and 2006 were sharply divided between the "subdue the Earth" set and "What Would Jesus Drive?" types. The National Association of Evangelicals, the nation's largest evangelical organization, sparred over but ultimately could not agree on a position statement that mankind has "a sacred responsibility to steward the Earth and not a license to abuse the creation of which we are a part."¹²

But the Christians who stuck around for Schlesinger's lectures were keenly interested in what he had to say, particularly when they saw his maps that show North Carolina's Outer Banks inundated with an 18-inch sea-level rise. Most models predict between a one-foot and three-foot sea-level rise along the eastern seaboard by 2100. Schlesinger plays it safe with the median projections, about 18 inches. That rate would hasten the demise of freshwater supplies in coastal cities vulnerable to salt-water intrusion and cause severe erosion, flooding, and destruction of wetlands—particularly in Louisiana and Florida.

That is nothing compared to what will happen if, say, Greenland's massive ice sheet melts. A team of scientists at the University of Arizona's Institute for the Study of Planet Earth reported in 2005 that warmer temperatures are melting the Arctic ice sheet and glaciers so quickly they could result in ice-free Arctic summers, not seen for a million years. "What really makes the Arctic different from the rest of the non-polar world is the permanent ice in the ground, in the ocean and on land," says the team's leader, geoscientist Jonathan T. Overpeck. "We see all of that ice melting already, and we envision that it will melt back much more dramatically in the future."¹³

If Greenland melts, it would raise sea levels by 7 meters, or 23 feet. Even a partial melting would cause a 1-meter, or 3-foot, rise.¹⁴ Overpeck and his colleagues have used computer models to create a series of maps showing how the most vulnerable parts of the globe, including Florida, would look in the case of a 1-meter to 6-meter rise. The Florida maps show the entire coastline swamped under the 1-meter scenario. With a 6-

M I R A G E

meter rise, all the cities along the southeast Florida coast would be covered in water, as would the Fort Myers/Naples area, St. Petersburg, Jacksonville, and low-lying parts of Orlando.

In 2005, Florida's regional planning councils began to work on coastal maps to figure out what parts of the state should begin to mitigate the impacts of sea-level rise. You cannot help but think Florida has at least one thing going for it: the state's developers are very, very good at getting rid of water. And building atop it. They have been doing so for more than 150 years.

Scientists are more and more certain that global warming will cause the sea to rise. In a different debate swirling around global warming, they are far less so.

H U R R I C A N E A L L E Y

In the wake of devastating Hurricane Katrina in August 2005, scientists, journalists, and everyone else seemed to be searching for answers to the question of whether global warming was making weather more severe. Screamed the cover of *Time* magazine that October: ARE WE MAKING HURRICANES WORSE? It makes sense. Warmer air can translate into warmer oceans—and warm oceans drive the force of hurricanes.¹⁵

Curry and her Georgia Tech colleagues published a study in the journal *Science* that surveyed global hurricane frequency and intensity since 1970. Theirs (and other studies concur) found no increase in the frequency of hurricanes. But they found a sustained increase in hurricane intensity. Overall, they found that the number of Category 1, 2, and 3 storms had fallen slightly, while the number of Category 4 and 5 storms had climbed dramatically. In the 1970s, the number of 4's and 5's each year averaged ten. Since 1990, the annual number nearly doubled, to eighteen. Overall, the big storms jumped from 20 percent to 35 percent of the total worldwide.¹⁶

Other hurricane scientists argue it is not enough to go back to 1970, the year satellites first began collecting atmospheric data and images. Hurricane severity ebbs and flows over decades. Consider Florida's bad luck in the 1920s and 1930s. Major hurricanes in 1926, 1928, and 1935 killed 2,487 people in South Florida at minimum. The 1935 hurricane, a Category 5 storm, holds the record as the most intense ever to strike the United States. Among the more than 400 dead were 256 impoverished

The Wetlands and the Weather

war veterans who had been sent to the Keys by the Federal Emergency Relief Administration to fill gaps in the highway between the mainland and Key West.¹⁷ Testifying before Congress later in 1935 on providing compensation to survivors, Florida Congressman J. Mark Wilcox admitted that while thousands had died in Florida hurricanes in the prior ten years alone, “it is not a good thing to talk about, it is a thing I hate to mention, because it is not good advertising.”¹⁸

As it often does, nature gave Floridians plenty of time to forget. It was a quarter century before the next catastrophic hurricane hit the state. Donna, in 1960, hit the Keys, slammed into southwest Florida, barreled across the interior, then exited the northeast corner of the peninsula before traveling up the entire eastern seaboard. Donna remains the only storm of record to send hurricane-force winds into Florida, the mid-Atlantic states, and New England. The storm left houses piled like Tinkertoys in the Keys, a result of 128-mile-per-hour sustained winds and 13-foot storm surges. In all, Donna killed 50 people and caused \$387 million in damage in the United States.¹⁹

In 1969, Florida was spared the destruction of Camille, a Category 5 hurricane, when it made landfall along the Mississippi coastline. The second-most-intense hurricane to hit the nation, Camille’s wind speeds will never be known because it destroyed every wind-recording instrument on the Mississippi coast. Columbia, a small town 75 miles inland, reported 125-mile-per-hour sustained winds. Camille killed 256 people and caused \$1.42 billion in damage.

And then, just like before, there was a decades-long lull in severe storms in the United States.²⁰ From 1969 to 1989, when Hurricane Hugo hit just north of Charleston, South Carolina, Floridians paid little heed to the possibility of hurricanes. During those two decades, the state saw another extraordinary building boom, this time along both coasts, as did other hurricane-prone areas including coastal Texas; Savannah, Georgia; Charleston, South Carolina; and Mobile, Alabama.

In 1992, Hurricane Andrew killed 25 people and caused \$30 billion in property damage in South Florida. But even the costliest hurricane in U.S. history did not slow migration to the coasts. By 2005, 13 million of Florida’s 17 million residents lived in coastal counties. It was a national trend. At the turn of the twenty-first century, 53 percent of Americans, or 148.3 million souls, were living in coastal counties.²¹ The math looks like this: more people in harm’s way, minus the wetlands and other natural

M I R A G E

barriers between them and the storms, plus more Category 4 and 5 storms, equals more casualties and costlier damages.

The federal government helps increase these odds, in a number of ways. First, the Army Corps, which regulates impacts to wetlands, permits the construction. Then, as homes and condos replace wetlands, the shoreline begins to erode. No worries. Congress gives Florida, Texas, New Jersey, and other states millions of dollars a year to rebuild their beaches. Between 2004 and 2006, local, state, and federal dollars devoted to beach and dune rebuilding in Florida alone added up to \$409 million, the largest such effort ever.²² Beach rebuilding is now the fastest-growing part of the Army Corps' work.²³ Sometimes, state and local governments come back within just a few years to ask Congress for more money after storms wash rebuilt beaches away.²⁴

But the biggest subsidy for coastal living is the federal flood insurance program. Most people could not afford to live near the water without the taxpayer-funded program, which provides relatively cheap insurance—as little as \$400 a year per \$100,000 in coverage—in areas where private companies will not write policies.

America's approach to development and flood control—the wetlands drainage, the dams, the levees, the river channelizations, and the manipulation of the coasts—has proven foolhardy again and again. Flooding may be the worst problem faced by residents in coastal counties, but fouling up the freshwater supply is a close second. In Florida, peninsular Pinellas County was the first county in the state to blow out its natural water supply, a result of overpumping and dense development. In North Carolina, fifteen coastal counties have dried up their once-bountiful aquifer. The Coastal Plain aquifers of southern New Jersey have seen water levels drop by 200 feet in areas, with some dipping below sea level.

But nothing so painfully demonstrated the need to stop manipulating water and wetlands than the hurricane that drowned the beautiful city of New Orleans in 2005.

When Hurricane Katrina churned into Louisiana and Mississippi that fall, killing more than 1,300 people, Americans stayed glued to round-the-clock television and Internet news, horrified that one of the great cities of the United States could be extinguished like some modern-day Pompeii. The floating bodies and impoverished survivors caught twenty-first-century Americans by surprise. Some called it an act of God. Hurri-

The Wetlands and the Weather

cane Katrina, said President George W. Bush, was “one of the worst natural disasters in our nation’s history.”²⁵

But the catastrophe was, to a large extent, man-made. If building New Orleans below sea level was foolish, removing all natural barriers between the city and the sea was idiotic.

Louisiana and Florida, with their salty grass flats and their great tupelo swamps, have more wetlands than any other of the lower forty-eight states. But they should have a lot more than they do. Louisiana’s wetland acreage has shrunk from 52 percent to 27 percent of the state, with a total 7 million acres wiped out. Florida’s wetland acreage has shrunk from 54 percent to 31 percent of the state’s total surface area. That includes the destruction of the mother of all wetlands—the Everglades—as well as smaller but no less significant losses that add up to more than what was lost in the great marsh. Across Florida, 9 million acres of wetlands have vanished.²⁶

The benefits of wetlands to wildlife are well-known. They are the baby nurseries for most fish, homes to countless animals and birds. The ivory-billed woodpecker, believed extinct for sixty years but recently spotted in an Arkansas wildlife refuge, lived on insects in giant floodplain trees that were logged out of America’s bottomlands. The extinct Carolina parakeet ate the seeds in cypress tree balls.²⁷ More life teems in one acre of healthy wetland than in an acre of almost any other type of habitat.²⁸

But “natural disasters” such as Katrina remind us that wetlands are important to people, too. When they lost all those acres, Floridians and Louisianans lost their most important tool for flood control. They lost their best weapon against shore erosion, against fires. They got rid of a key cog in their drinking-water supply system, since wetlands absorb water during wet seasons and gradually release it during dry times. They eliminated their best natural filter for cleaning water. Because wetlands take in water from higher ground, they act as natural filters that absorb nutrients, toxic substances, and disease. A good example of the natural filtering capacity of wetlands is a cypress-gum swamp west of Tallahassee that absorbed lead from years of washing car batteries with acid, preventing serious health hazards downstream.²⁹

Since the early twentieth century, Americans had destroyed more than a million acres of Louisiana’s coastal wetlands, or 1,900 square miles. Between 1890 and 1925, loggers wiped out virtually all the state’s

M I R A G E

virgin bald cypress forests. For the rest of the century, developers, oilmen, and the Army Corps razed tupelo and cypress stands and wiped barrier islands clean of mangroves as they cleared the path for industry, oil pipelines, levees, and canals. The wetlands and the islands, the mangroves and the trees, all helped protect coastal Louisiana by absorbing energy and water from storm surges—the most dangerous element of hurricanes.³⁰

A powerful surge can swamp inland areas 20 feet or more. Scientists say that each square mile of wetlands absorbs enough water to knock the surge down by one foot.³¹

“God is getting a bum rap,” environmental historian Theodore Steinberg complained about the characterization of Katrina as natural disaster. The hurricane’s deadly destruction was “an unnatural disaster if there ever was one,” he says, “not an act of God.”³²

No scientist could say with certainty whether Katrina’s deadly force had increased due to warmer ocean temperatures caused by global climate change. What had increased, with certainty, was Americans’ willingness to destroy the wetlands that mitigate the dangers of coastal living. And to build homes and businesses where they should not.

PUTTING THE WATER BACK

When the killer hurricane of September 1926 raged through Florida’s Everglades, it devastated a sprawling sugar plantation northwest of Miami owned by the Pennsylvania Sugar Company. Like so many other South Florida interests during those brutal years, Pennsylvania Sugar could not withstand the double blow of first the storm and then the Great Depression. In 1931, company officials decided to write off the Everglades and Pennsuco, a company town in the swamp. As part of a severance package, they gave 7,000 acres to their Pennsuco foreman, Ernest “Cap” Graham, for the value of the outstanding taxes.³³

Cap Graham converted to cattle, the business of his family back in Michigan. Graham Dairy became one of the best-known businesses in Dade County. Those acres brought him fortunes he could not have achieved as a sugar foreman: he made millions, served in the state senate, sent sons to Harvard. His oldest, Philip, would marry the daughter of the publisher of the *Washington Post* and make a small-time paper into a publishing empire before taking his own life. Graham’s two other sons

The Wetlands and the Weather

would go into that most classic Florida profession: development. They would turn their father's swampy land into the planned community of Miami Lakes, multiplying the family millions.³⁴

But the youngest, Bob Graham, also was drawn to politics. His brother Philip was an inspiration. A political savant, Philip was the adviser who cajoled Jack Kennedy in 1959 to tap Texas Senator Lyndon Johnson as his running mate in order to beat Richard Nixon in the conservative South. Bob Graham would win votes for nearly half a century: four terms in the Florida legislature, two as governor of Florida, and three more in the U.S. Senate before a brief run for the U.S. presidency in 2004. (In the end, Graham withdrew, deciding to maintain his track record of never losing an election.)

Graham's biographer, *Palm Beach Post* reporter S. V. Dáte, points out that the Graham family wealth is based on the three things most damaging to Florida's Everglades: sugar farming, cattle ranching, and urbanization. Despite this, or perhaps, Dáte posits, because of it, Graham became the first governor of Florida to champion the huge task of restoring the ecosystem.³⁵ In other words, he wanted to put the water back.

As a young state senator from fast-growing Dade County, Graham had carried the landmark land and water bills for Askew in the upper chamber of the legislature in 1972. During his turn as governor from 1979 to 1987, Florida would see yet another round of environmental protection and development laws, including a tough growth-management law that was the first of its kind passed in a large, urbanized state.

Graham had learned the importance of well-planned growth during his family's development of Miami Lakes. (The town, it must be said, is in a drained Everglades wetland.) The charming "new town" had its own downtown, winding streams and curving streets, public parks, and underground utility lines—popular ideas now but unheard of in Florida in the 1950s. Key to the design was the company's ability to control development. "As the sole owner of all the surrounding lands, the Gramhams carefully plotted where each pocket of stores and office buildings went, eliminating stretches of strip malls and industrial parks that define many faceless suburbs," wrote the *Miami Herald*. The investment paid off, as Graham Companies earned a fortune selling homes to eager suburbanites in the 1960s and 1970s.³⁶

Florida's heralded 1972 laws included a planning regimen called "Developments of Regional Impact" that developers had to go through

M I R A G E

any time they built a project with larger-than-local impact. It was supposed to encourage well-planned developments like Miami Lakes. But by the time Graham moved into the governor's mansion, it was doing just the opposite. Developers complained it was expensive, time-consuming, and duplicative. So they simply did smaller projects to avoid it.³⁷ Piecemeal construction was the order of the day, and it showed. Florida's cities at midcentury had character. By 1980, local color was rapidly giving way to generic strip malls and low-density residential tracts.³⁸ That pattern, in turn, created an infrastructure crisis. The water systems were overtaxed. Traffic jams were getting longer. Schools were crowded, the sewage systems not expanding quickly enough for the 893 new people who showed up in Florida each day.³⁹

Graham took office intent on changing Florida's environmental "value system." Despite a growing sensitivity toward the land, too many Floridians, he said, still saw nature as a commodity: "the purpose of Florida was to alter that commodity to make it more marketable and sell it as fast as we could," he said. Graham wanted to "convince people that we had a different relationship to our environment. That we were trustees, not consumers, and we ought to be thinking about how we can fulfill our trust responsibility."⁴⁰

But like every other governor in Florida history, Graham worked just as hard to draw more and more people and businesses to the state, exacerbating the problem he was trying to solve. Graham pushed major infrastructure upgrades to the ports, airports, and highways to promote growth and development. In fact, Graham, credited with bringing "growth management" to Florida, never liked the term. He said it "makes it sound as if growth is something that would be bad for Florida."⁴¹

Graham's style was deliberative, and some called him "Governor Jello" for not moving fast enough for the fast-growing state.⁴² But his environmental initiatives would prove enduring. His new growth-management law required every local government in Florida to draw up land-use plans that also had to be approved by the state. (The law does not work too well because developers are often able to convince local governments to change the plans. Especially to extend urban growth boundaries into wetlands or other boondocks.)

Most importantly, Graham set the state and federal government on their current path to restore the Everglades, in as much as it can be

The Wetlands and the Weather

restored with 7 million people living in South Florida. In 1983, he unveiled his “Save Our Everglades” program, a major effort to see that “the Everglades of 2000 looks and functions more like it did in 1900 than it does today.” That did not come to pass. But an important part of the restoration Graham championed has. The \$500 million Kissimmee River project offers today’s best hope that restoration plans for Louisiana, the Chesapeake Bay, and a great marshland in southern Iraq, drained by huge channels and canals on the order of Saddam Hussein in the early 1990s, are more than pipe dreams.

It was a crusading Fish and Wildlife Service biologist named Arthur R. Marshall Jr. who convinced Bob Graham the only way to restore the Kissimmee River was to get rid of the works of man. Marshall had a plan to blow up the engineers’ dams, backfill the ramrod-straight C-38, and buy back the surrounding former wetlands that had been filled for cattle pastures. “It is time—well past time—that we abandoned the centuries-old belief that man’s dominion over the earth includes its willful destruction,” Marshall once said. Graham agreed.⁴³

It was nearly two decades from the day Graham’s Save Our Everglades plan set out to “re-establish the values of the Kissimmee River” until the first dam above Lake Okeechobee exploded into gray smoke and chunks of concrete. But explode it did. The river’s restoration remained Graham’s top environmental priority after he was elected to the U.S. Senate. In 1990, he slipped language into a public-works bill that authorized the Army Corps to take on purely environmental projects. *Washington Post* reporter Michael Grunwald, a historian of the Everglades who has written extensively about the Corps, called it “a little-noticed turning point for an agency that has traditionally taken on environmentally disastrous projects.”⁴⁴

On a bright, clear day in June 2000, a South Florida Water Management District scientist named Lou Toth stamped his foot on a detonator and blew up one of five dams that held back the Kissimmee River. The district and the Army Corps also removed a boat lock and backfilled seven miles of the C-38. Since then, progress on the project has slowed; large portions of the river are still channelized and dammed, and historic hydrologic conditions have yet to be fully reestablished in the recovering wetlands.⁴⁵

But one look at the Kissimmee today leaves little doubt that humans really can fix their mistakes in the natural world: fourteen miles of nat-



The C-38 canal and one of five dams that held back the Kissimmee River, the dynamite explosion, and the free-flowing river today.
(Photographs courtesy of Lou Toth, South Florida Water Management District.)

The Wetlands and the Weather

ural, meandering river overflows the Kissimmee's banks into 10,000 acres of wetlands once drained dry. Scientists see sandbars, sandy bottom, and other signs of improvement to fish and wildlife habitat in the channel. Isolated parts of the remnant river have been reconnected and flow again. Wetland vegetation has reappeared and thrives on the riverbanks and adjacent floodplain lands. Waterfowl and wading birds, whose numbers dropped 95 percent in South Florida in the twentieth century, are flocking back to the area.⁴⁶

A much-lesser-known law that passed during Graham's days in the governor's office probably did more than any other before or since to protect what remained of Florida's wetlands. The Warren S. Henderson Wetlands Protection Act of 1984 required, for the first time, that any dredging or filling of wetlands, including upland and isolated ones, must be permitted. Just as the Randell Act in 1967 was named for its fishing-enthusiast sponsor, so the Henderson Act was named for its sponsor, a Republican senator from Venice who also was concerned about adverse impacts to fish and wildlife. Under the law, among the many factors the state's Department of Environmental Protection must weigh before letting an applicant destroy a wetland is whether the project will harm fishing and recreation or marine productivity.⁴⁷

Lawmakers named the act after Henderson when they realized it would be his last good deed in the Florida legislature. Certainly, they didn't do it as a reward for his behavior on a bus trip to the St. Marks Wildlife Refuge south of Tallahassee in early 1984 to look at some wetlands. Unfortunately for Henderson, a couple reporters were along for the trip, during which the senators aboard made the driver stop for booze. By the time they got to St. Marks, they were hammered. Henderson, in addition to making some crude sexist remarks, scooped up a young *Orlando Sentinel* reporter named Donna Blanton and twirled her around with glee.⁴⁸ (Blanton is now a powerful lawyer who successfully represented former secretary of state Katherine Harris in Florida's notorious presidential recount of 2000.)

The tale says a lot about the Tallahassee press corps, not infrequently a stepping stone to a career in political public relations. None of the reporters on the bus came back and filed a story about drunken lawmakers on a taxpayer-financed fieldtrip. Brian Crowley of the *Palm Beach Post*, who had not been on the trip, heard the rumors a few days

M I R A G E

later and jumped on the story. He started making the rounds of the shabby three-story press building near the capitol to interview eyewitnesses. Realizing they were about to be scooped, everyone decided to write about the scandal.

The much greater scandal, of course, was the way Florida's growth industry continued to get around the Henderson law and the many other efforts to protect wetlands that followed it.

“THE 'BURB THAT ATE THE WETLANDS”

If ever there was a town that should not exist, it is Weston, Florida. The master-planned community juts “like a thumb sticking in the eye of the Everglades,”⁴⁹ in the words of one environmentalist, in western Broward County on the state's jam-packed southeast coast. To get there, you can take Florida's Sawgrass Expressway, which wiped out sawgrass, or the Panther Parkway, which devastated panther habitat. The city of 65,000 is flush up against the remaining Everglades. If you stand at its edge with your back to the city, the vista is sawgrass, as far as you can see. Turn around, and the view is clay-colored rooftops, as far as you can see.

In the 1950s, Arthur Vining Davis, the multimillionaire cofounder of Alcoa, the Aluminum Company of America, bought 10,000 acres of swamp, sawgrass, and ranchland in southwest Broward County for an average \$300 an acre. Four years before his death in 1962, Davis founded a land-development firm called Arvida. In 1974, the company announced plans to build a city of 20,000 homes in a place that was more water than land.

The Broward County Planning Council warned that the project would threaten South Florida's natural water supply, noting the site was “on the Biscayne Aquifer, the sole source of drinking water in Broward County, which lies only a few feet below the surface.” The report also said that Weston was “located within a very hazardous flood plain . . . more prone to frequent and severe flooding than any other portion of the county.”⁵⁰

But Arvida had a familiar plan to make sure its new town—then called Indian Trace—would stay high and dry. The *Fort Lauderdale Sun-Sentinel* explained it in a Sunday front-page story called “The 'Burb that Ate the Wetlands”: using tax-free bonds that its residents would have to pay back over the next three decades, Arvida would drain and divert the

The Wetlands and the Weather



Like most cities in southeast Florida, Weston was built on a swamp. In the background: the Everglades.

(Photograph by Rob C. Witzel, courtesy of *The Gainesville Sun*.)

water and use the dredged-up fill to raise the surrounding land. The company would scrape away tons of muck soil from the swamp, dynamite and dredge a vast system of canals and lakes at least 30 feet deep, and use the fill to make instant real estate.⁵¹

The county opposed the plan; commissioners passed a tough new land-use ordinance in 1977 to try to stop it. Arvida hired an army of lawyers, lobbyists, and publicists to change local politicians' minds. Even the Army Corps opposed the plan; in 1987, the Corps declared more than a third of the 10,000 acres endangered wetlands. Going over the heads of local Corps regulators, Arvida officials flew to Jacksonville to convince brass to soften the agency's stance. Even Broward County's delegation in the Florida legislature, as well as the Florida Department of Community Affairs, opposed the special tax district, which, they said, amounted to taxation without representation. But with the help of the lawyers and the lobbyists, that passed too.⁵²

Today, Weston is one of the hottest addresses in South Florida.

M I R A G E

When Hurricane Andrew in 1992 blew Miamians north with insurance checks in hand, many who could afford it settled in one of Weston's meticulous homes. Upheaval in Latin America sent swarms of wealthy, family-oriented Latinos to Weston, where they felt safe behind its many guard gates. The town's crime rate is a third of that of Broward and Palm Beach counties; a sixth that of Miami-Dade's. It is home to celebrities such as Miami Dolphins quarterback Dan Marino. It has some of the best schools in southeast Florida. Arvida officials point out that to complete their final phase of 941 acres, they had to restore and preserve another 1,559 acres of wetlands.⁵³

But Weston juts like a thumb into the path of Everglades restoration, too. Weston and the development it drew to the surrounding swamplands also presents an enormous challenge for the water managers who control the Everglades' pumping stations and hundreds of miles of canals that keep Broward County's cities from flooding. The vast majority of freshwater wasted in South Florida is not really from lawn sprinklers. Rather, it is the amount drained off each day to keep the whole place dry.

More than anything, Weston opened up western Broward County for development. The town's political clout helped bring Interstate 595 to its front door, which in turn drew thousands more housing developments to the edge of the Everglades. Just like always, it was not the laws on the books that allowed thousands more acres of wetlands filled, brought thousands more people to settle in a fragile land. It was politics.