



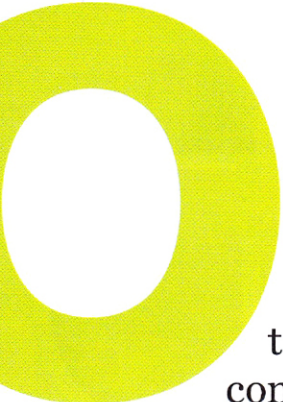
PLOWED UNDER

Across the northern plains, native grassland is being turned into farmland at a rate not seen since the 1920s. The environmental consequences could be disastrous.

BY JOCELYN C. ZUCKERMAN

Soybean harvest in Mount Vernon, South Dakota, October 2013

This article was developed in collaboration with the Food & Environment Reporting Network, an independent, nonprofit news organization producing investigative reporting on food, agriculture, and environmental health.



n a rainy Monday in mid-October, six middle-aged men in denim and camouflage sat bent over coffee mugs at the Java River Café, in Montevideo, Minnesota. With its home-baked muffins and free Wi-Fi, the Main Street establishment serves as communal living room for the town of 5,000, but the mood on that gray morning wasn't particularly convivial. The state's pheasant season had opened two days earlier, and the hunters gathered at the café for what should have been a brag fest were mostly shaking their heads. "You didn't see anybody out there who was over the limit, did you?" a guy in a baseball cap asked with obvious sarcasm, to sad chuckles all around.

The region's game birds are in serious trouble. Driving across South Dakota the following afternoon with the radio on, I learned that Governor Dennis Daugaard had just announced an emergency pheasant-habitat summit. Last summer, the state's Department of Game, Fish and Parks recorded a 64 percent decline in the number of pheasant broods from the already record low levels of 2012. Though a rainy nesting season and an early fall blizzard hadn't helped matters, the region's problems involve more than inclement weather—and extend far beyond the birds.

While few seem to be aware of it, a massive shift is under way in the northern plains, with ramifications for the quality of our water and food, and, more fundamentally, the long-term viability of our farms. A study published in February 2013 in the *Proceedings of the National Academy of Sciences* found that between 2006 and 2011, farmers in the Dakotas, Minnesota, Nebraska, and Iowa—the Western Corn Belt—had plowed up 1.3 million acres of native grassland in order to plant corn and soybeans. "People had been talking about the land conversion," says Chris Wright, an assistant research professor at South Dakota State University and a co-author of the report, "but there weren't any recent numbers."

Relying on satellite data from the U.S. Department of Agriculture (USDA), Wright and his co-author, Michael Wimberly, found that the rates of land-use change in the region—up to 5.4 percent annually—parallel

the deforestations taking place in Brazil, Malaysia, and Indonesia. The shift represents the most rapid loss of grasslands since tractors began breaking sod on the Great Plains in the 1920s. Most of the conversion is happening on lands that are at risk from erosion or drought, and, in some cases, both.

While grasslands may not be the most charismatic of landscapes—"Anyone can love the mountains," the local saying goes, "it takes soul to love the prairie"—they, and the wetlands that tend to go along with them, are among the most important ecosystems on the planet. For one thing, they contain disproportionately high numbers of plant and animal species. (More than a third of species on the U.S. endangered species list live only in wetlands.) They also provide a range of critical "ecosystems services," soaking up rain and snowmelt and slowly releasing water in drier seasons, thereby reducing flooding and erosion and improving water quality by filtering out fertilizers and pesticides that run off of farmland. Fewer wetlands mean more chemicals making their way into local waterways and ultimately ending up in the area in the Gulf of Mexico known as the Dead Zone, where nutrient pollution has made it challenging for marine life to survive. Finally, and crucially, the deep-rooted grasses that constitute the world's prairies hold massive amounts of carbon: nearly one-third of total stocks, almost as much as that stored by forests.

The Nature Conservancy has called grasslands the world's most imperiled ecosystem,

and their demise has ramifications for climate change, as all of that carbon gets released into the atmosphere. (Row crops, which have much shorter roots, store carbon only briefly, and far less of it.) Unfortunately, once the prairies—composed of some 200 types of grasses, forbs, and sedges—have been destroyed, they are virtually impossible to bring back.

"It's a major, creeping, ecological disaster," Craig Cox, senior vice president for agriculture and natural resources at the Environmental Working Group (EWG), told me in the conference room of his office in Ames, Iowa. His research and advocacy organization, which is based in Washington, D.C., released its own study on this vast ecological re-engineering in July 2013, with conclusions similar to Wright's. In just four years, the EWG found, South Dakota, North Dakota, and Minnesota lost an area of wetlands the size of Rhode Island. Whereas states like Iowa and Indiana were mostly lost to corn and soy decades ago (Iowa retains one-tenth of 1 percent of its original tall-grass prairie), less favorable climactic and agronomic conditions had, until recently, left the western reaches of the Corn Belt largely untouched. A confluence of forces is now changing that dynamic. "If we continue down this road," Wright says, "we're going to turn the Dakotas into another Iowa."

NORTH AND SOUTH DAKOTA, particularly the landscape known as the Prairie Pothole Region, a network of wetlands formed by glaciers 10,000 years ago, exude a moody, rugged



Grasslands Evangelist: Fourth-generation rancher Lyle Perman (center) looks over the biodiverse pastures on his land near Lowry, South Dakota.

allure. Overgrown puddles pock the undulating fields and shift from gray to shimmering silver when the sun peeks through the clouds. Known as “the nation’s duck factory,” the region is the breeding ground for more than half of North America’s migratory waterfowl. Eric Lindstrom, a government affairs representative with Ducks Unlimited, who is based in Bismarck, North Dakota, took me driving west of the city, where he pointed out speckled sharp-tailed grouse skittering over the tawny grass, and tiny, dark coots flying low over the water. Angus cattle dotted distant hills, and a group of Canada geese flew south in a V formation. Lindstrom directed my attention to some of the changes that Wright and Cox had documented. Among the iconic sites of the prairie potholes are giant boulders, some of them the size of compact cars, left scattered across the grasslands by glacial activity. Armed with modern excavation equipment, farmers are digging out the boulders—just as they are knocking down the lines of trees

known as shelterbelts—to make use of every corner. “We call those the headstones of the prairie,” Lindstrom said, pointing to a mound of enormous rocks sitting on the edge of a field.

I left Bismarck and drove south to the splendidly isolated home of Lyle Perman, a fourth-generation rancher near Lowry, South Dakota. So concerned is Perman about the changes around his Rock Hills Ranch—where it seems that every month another neighbor digs up native prairie to plant row crops—that the 59-year-old has become something of a grasslands evangelist. He brought me into his office, which shares a building with the horses and the tractors—one of which bears a bumper sticker that reads “Eat Beef. The West Wasn’t Won on Salad”—and pulled out the fat folder of newspaper clippings and academic reports he’s been compiling for the past few years. Clicking through a PowerPoint presentation that he put together in order to educate area farmers and ranchers on the matter, he talked about holistic land stewardship and paraphrased

the conservationist Aldo Leopold (“a man’s portrait is based on the kind of farm he has”).

Perman wasn’t always an outspoken environmentalist. “If you’d have come here ten years ago,” he told me, “you’d have gotten a different story.” Back in the 1970s, Perman and his dad would set off ammonium nitrate explosions to deepen the wetlands on their property, thereby shrinking their surface area and screwing up the habitat for wildlife. We climbed into his tractor and ranged over the rough prairie terrain, stopping at an outcrop with a panoramic view of his fields and cattle. Perman, who wore Wrangler jeans and a South Dakota Grasslands baseball cap, pointed to a stream in the distance. Years ago, his ancestors had plowed right up to its edge, he said, fouling the water downstream for decades. “There are some places,” he said, “that just aren’t supposed to be farmed.”

Perman moves his own cattle 100 times a year to mimic the pattern of the buffalo that once roamed the region, but he worries about



For The Birds: Prairie Potholes, like this one in the Benton Lake National Wildlife Refuge, near Great Falls, Montana, are scattered across a region that's known as "the nation's duck factory."

the long-term welfare of the state's more than \$6 billion livestock industry, which is steadily losing ground to crop farming. "Study the numbers," he said. "It takes 500 cows to make a living. It's pretty hard to run 500 cows by yourself. But to farm 500 acres? Forget it—that's nothing. That's a part-time job." Indeed, many farmers abandon their fields right after harvest and don't return until it's time to plant in the spring. ("It's funny," Chris Wright says. "You'll be flying in the winter, and you'll see all these folks—it's like the Beverly Hillbillies—going to Arizona, going to Mexico.") High land prices are also driving growers off for good; they sell out or rent to giant producers with deep enough pockets to outbid the locals for the land. So-called ground hogs, operators with tens of thousands of acres, often in different states, swoop in and buy up farms that they often never occupy, contributing further to the gutting of rural communities. "I don't like the government telling me what to do," Perman said, in true rancher style. "But if your

actions impact somebody else, then it becomes somebody else's business, too. And that's where I draw the line." Perman had e-mailed Wright when the researcher's findings were first published, and he's determined that others learn the truth about what's at stake in the region—and about who is, and who isn't, likely to reap the benefits of the conversions.

TO A LARGE EXTENT, THE U.S. government has been telling its farmers what to do since the 1930s, when a combination of severe drought and careless agricultural practices led to widespread soil erosion, dust storms that darkened skies as far away as New York City, and the devastation of the nation's heartland. Franklin D. Roosevelt introduced a shelterbelt initiative on the plains that involved the planting of hundreds of millions of trees, and 1956 saw the implementation of the Soil Bank Program, under which farmers signed multiyear contracts obliging them to adopt measures aimed at improving soil and water quality. When,

in the 1980s, the policy of planting commodity crops "from fencerow to fencerow," as had been advocated by longtime Agriculture Secretary Earl Butz, began to undermine those environmental gains, a Conservation Reserve Program, or CRP, was added to the 1985 farm bill. The initiative, which pays farmers to retire marginal croplands from production for 10 to 15 years, has been credited with helping to reduce erosion and damage caused by flooding and to increase wildlife habitat.

These days, though, in a trend that epitomizes the ongoing push-pull dynamic between the government's desire for land stewardship and farmers' inclination to increase their profits, CRP acreage is becoming harder and harder to find. Since 2008, some five million acres have been taken out of the program—more than all of Yellowstone, Everglades, and Yosemite national parks. In the Prairie Pothole Region alone, some 30 percent of CRP lands have expired in the past five years.

High commodity prices are an obvious



Fencerow To Fencerow: Over the past six years, corn and soy prices have nearly doubled, which has given farmers a huge incentive to expand their farmland and optimize their yields.

catalyst for the shift. Between 2007 and 2012, corn and soy prices nearly doubled. At the same time, farmers have become more efficient at optimizing yields from the land. Lindstrom and others pointed to advances in technology—to giant, \$400,000 combines equipped with precision GPS but ill-qualified to maneuver around pesky rocks and prairie potholes—and to genetically modified crops, which, by requiring less labor, enable farmers to plant more ground.

More than anything, though, federal policies are to blame for the changing face of the Western Corn Belt. In 2007, the government expanded the Renewable Fuel Standard, requiring oil companies to blend ethanol—made by fermenting and distilling corn—into the gasoline supply. The mandate started at 9 billion gallons and has risen each year since; it is now close to 14 billion gallons. The landscape alterations documented by Wright and the Environmental Working Group closely track the timing of the program's introduction,

although not everyone agrees the two are related. Commodity and ethanol groups like the South Dakota Corn Growers Association and the Renewable Fuels Association, for instance, dispute the connection. Geoff Cooper, senior vice president of research and analysis for the Renewable Fuels Association, criticized Wright's study, writing that "the extremely high rate of error" related to the satellite imagery "renders the study's conclusions highly questionable and irrelevant to the biofuels policy debate."

The federal government's crop-insurance scheme, which has undergone significant changes since 2000, has also played a role in the loss of prairie and wetlands. Launched by Congress in 1938 and administered by the USDA's Risk Management Agency, the program is semiprivate, with policies sold through 15 or so approved companies. The original intent of the insurance was to protect farmers from low yields resulting from weather-related disasters. But in 2000, "revenue insurance"

options were added, enabling farmers to insure themselves against not just low yields but also low prices. At the same time, Congress began increasing the amount of the premiums that the government would pay. Crop insurance, like traditional farm subsidies, for the past three decades had been linked to compliance on various conservation issues, but in 1996, that linkage was undone. The accumulated effect has been that ever-higher numbers of growers are signing up for policies that cover as much as 85 percent of their expected revenue. (If the crop fails or prices plunge, they get up to 85 cents on the dollar of what they projected they would earn.) In 2012, more than 80 percent of all eligible farmland was covered—some 282 million acres—without any requirement for farmers to keep their tractors off fragile lands. "It's becoming clear that the high prices are the primary driver for this conversion," the Environmental Working Group's Cox says, "but crop insurance is the grease."

Even those who are benefiting say that the



Richard Adee next to barrels of honey at his Bruce, South Dakota, plant

insurance program doesn't make a whole lot of sense. Darwyn Bach, a 50-year-old who grows corn and soy on 570 acres in western Minnesota, says that he's seen how increased insurance subsidies have encouraged careless farming in his own county. People clear and plant in areas where they realize the soil and water conditions are poor, because they know they'll get payouts anyway. Farmers breaking new land, he explains, often are allowed to base their insurance policies on the historic yields of their established plots. "I could rent a sand pile," Bach says, "and plant it with corn, knowing full well that it won't likely yield 100 bushels." Because his insurance policy would be based on his established 190-bushel yield, and having purchased the standard 85 percent policy, he'd be guaranteed 85 percent of 190 bushels regardless. "I guess what people are doing is farming the insurance," he says with a shrug.

In its July report, the Environmental Working Group described a correlation between counties where conversions are focused on fragile land and those receiving the highest crop-insurance payouts. Between 2008 and 2011, it reported, the 71 counties that lost more than 5,000 acres of wetlands and wetland buffers received an average payout of \$10.1 million—more than four times the \$2.3 million average across the 3,109 counties studied. "I know it's a big player," Bach says, "because we base a lot of our cropping decisions on the insurance policies." The more crops farmers

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grow, he adds, the more premium support they receive, so the scheme favors big corporate farms over family ones. What's more, taxpayers cover some 60 percent of the premiums. The private insurance companies, some of which are based overseas, receive as much as \$1.3 billion annually from the government, which also pays their overhead and administration costs and backs them against losses. "Crop insurance is the thing now," Bach says. "That's really a mistake for many reasons. Without compliance, it's a terrible deal for the taxpayer because it's very expensive, and they're getting no protection for land or water quality."

So intense is the current drive to plant commodity crops that even golf courses and centuries-old cemeteries have fallen prey to the plow. In November 2012, a farmer in western

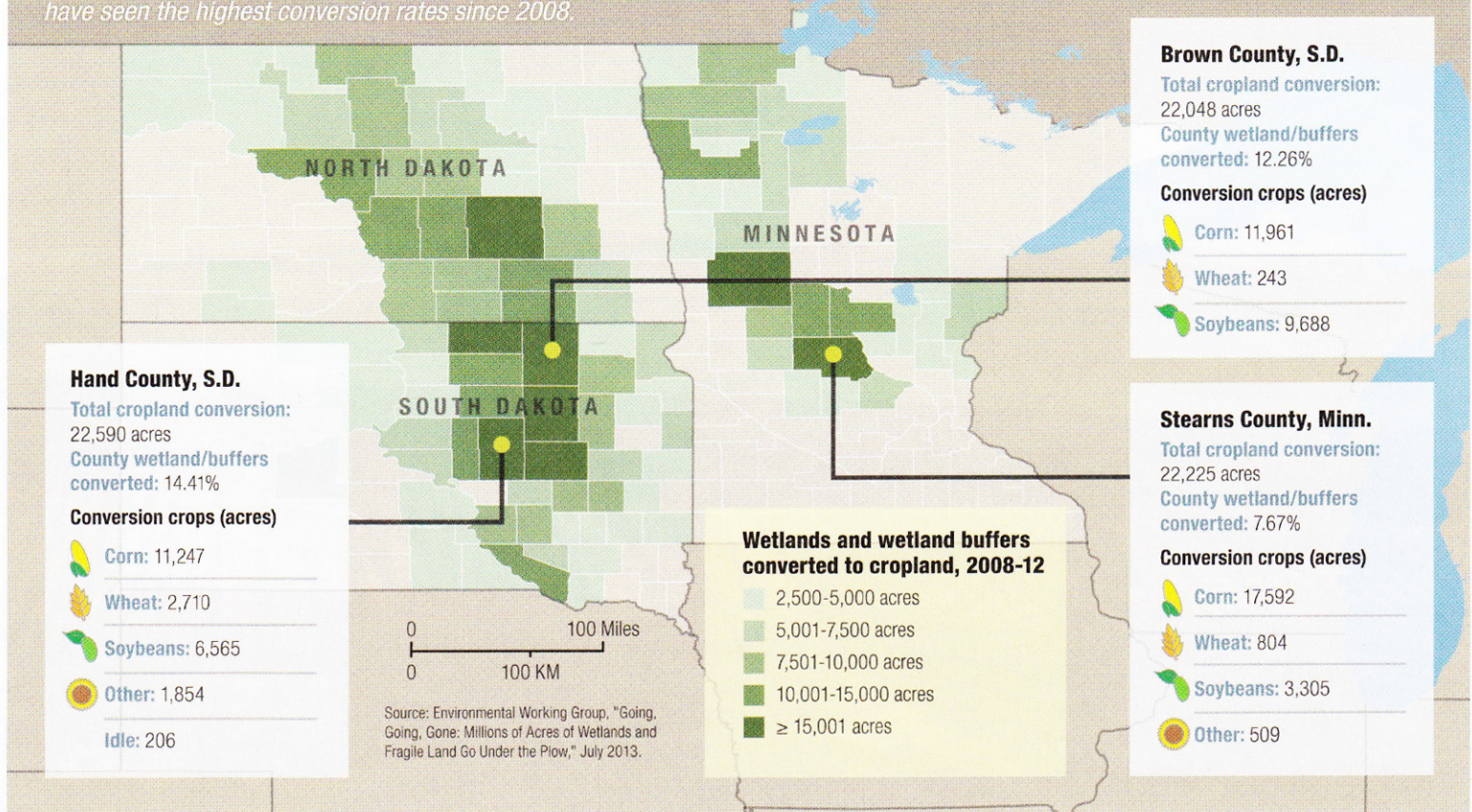
Minnesota did away with a cemetery dating to the 1890s (a potential felony under that state's law), and over the past three years, golf courses in Illinois, Iowa, and Michigan have been destroyed to make way for corn and soy.

AMONG THE MOST WORRYING casualties in the land-use changes are the nation's pollinators—those insects that make food production possible. Bruce, South Dakota, population 204, is a town built on the backs of bees. Aside from a tiny grocery store, a bank, and a bar, pretty much every building in the place is devoted to the rearing of the winged creatures or the processing of their honey. Richard Adee is the town's patriarch. A second-generation beekeeper with flushed cheeks and unruly white eyebrows, he oversees Adee Honey Farms—with 80,000 colonies, it's one of the largest honey producers in the nation. About four years ago, Adee says, he began to notice worrying changes among his swarms. "When I first came here, 50 years ago, you could count on making 120 pounds of honey per hive," he says. "That's what we based our budgets on. It's just been going down and down and down. Last year it was 55. This year it was 45."

Bees require a diverse diet to crank out honey. With their outsize floral diversity—big bluestem and green needle grass mingling with Canadian wild rye, milkweed, and scores of other species—the nation's prairies have always provided it. But, Adee says, with so many farmers spraying with Roundup—the herbicide manufactured by the giant agricultural company Monsanto and designed for use with crops genetically modified to resist it—the native plants don't have a chance. "That's just wiping out every plant in the field that might carry a little pollen or nectar," he says. Although the Roundup technology was meant to cut down on the use of herbicides, the recent emergence of super-weeds resistant to glyphosate, its active ingredient, has resulted in more spraying. Bees are not the only collateral damage: National populations of monarch butterflies, which feed on milkweed, have declined precipitously—by as much as 81 percent between 1999 and 2010. (In addition to habitat loss in the U.S., the monarchs' winter home in Mexico has shrunk.)

Grasslands to Farmland

Commodity farmers in the Midwest are converting grasslands and wetlands to corn, soy, and wheat fields at the most rapid pace since tractors broke sod in the 1920s. One result: a falling population of game birds. Brown, Hand, and Stearns counties have seen the highest conversion rates since 2008.



Adee drove me over to what he calls the load-out, a clearing among some trees where white wooden beehives piled two high were lined up in rows awaiting transport to warmer climes. The company makes half of its money from its pollination services—mostly of California almonds and Washington apples—but that business, too, is suffering. “The almond growers are very concerned,” Adee said, as bees swarmed outside the vehicle. The combination of an increasingly sterile agricultural landscape, he said, and the disease known as colony collapse disorder, which may be associated with a pesticide used on corn, is posing a national threat. Almonds are California’s No. 1 export crop, a \$4 billion business, but the nation’s blueberries, cantaloupes, cucumbers, onions, and much more also depend on bees.

Adee, too, had been looking forward to hunting season and to the arrival of friends from Mississippi, who fly in every October for the occasion. They could be counted among the 100,000 hunters who descend on the state

each year and spend \$173 million in its lodges and outfitting shops. But just a few days earlier, Adee’s friends had canceled on account of the lack of birds. “Nobody’s coming,” he said. “It’s just sad.”

A FEW PROVISIONS IN THE new farm bill—the massive legislation that determines agricultural policy in this country and was signed into law in February after having been delayed repeatedly since mid-2012—will be key to determining the fate of the Western Corn Belt. The farm, ethanol, and insurance groups, for instance, are pleased the bill expands the crop-insurance program, while eliminating traditional direct-payment subsidies. (Together, those interest groups spent some \$52 million on lobbying in the 2012 election cycle, according to the Washington, D.C.-based nonprofit Sunlight Foundation.) The Congressional Budget Office has estimated that the program will cost taxpayers \$90 billion over the next ten years, nearly twice as much as the subsidy programs it replaces. The

insurance program was augmented despite the efforts of such unlikely bedfellows as the Environmental Working Group and libertarian-leaning outfits like Taxpayers for Common Sense and the Cato Institute, which has called the program a “long-standing rip off of American taxpayers.” (Just a month after passage of the bill, the Government Accountability Office released a report recommending that, given the increase in weather disasters expected to result from continued climate change, the USDA consider the financial impacts of its role as a reinsurer for the private crop-insurance companies.) The final bill also leaves out a provision, present in both the House and Senate versions, that capped payments to individual farms at \$50,000, increasing the limit instead to \$125,000. Upon the House passage of the bill, Taxpayers for Common Sense issued a statement lamenting that the legislation “increases spending on handouts for profitable agribusinesses during a time when the agriculture sector is experiencing record profits.”



In Plain Sight: Between 2006 and 2011, farmers plowed up more than 1.3 million acres of grasslands to plant commodity crops like corn and soybeans.

Environmental groups welcomed the news that the bill would re-link conservation-compliance measures to federal crop insurance and that it includes a “sodsaver” provision, which limits insurance subsidies for the first few years in areas converted from native prairie to cropland. (The measure is limited to six states, however—Iowa, Nebraska, Minnesota, Montana, North Dakota, and South Dakota—leaving the the southern prairies unprotected.) But the bill also cuts \$6 billion from conservation funding—the first decrease since such programs became a part of the farm bill in 1985—and lowers the cap on

CRP acreage from 32 million to 24 million by 2018. Lynn Tjeerdsma, senior policy adviser for John Thune, the Republican senator from South Dakota, suggested that the combination of re-linkage and the sodsaver provision “will really make farmers think twice before they break up their grass in the future.” But others are concerned that the net effect of the legislation will be less conservation. “We have fashioned a farm policy that incentivizes putting more under the plow,” says Adam Warthesen, federal policy organizer for the Land Stewardship Project, based in Minneapolis, “and this farm bill doubles down on that.”

Also potentially significant in the coming months would be an adjustment to the Renewable Fuel Standard. In November, the Environmental Protection Agency proposed cutting the required amount of ethanol in the nation’s fuel supply. Not surprisingly, the agricultural and commodities lobbies cried foul. That same month, the Associated Press published an article citing Chris Wright’s research and placing the blame for the destruction of the nation’s prairies on the ethanol mandate. “There is probably more truth in this week’s *National Enquirer*,” the Renewable Fuels Association’s Geoff Cooper told a group of reporters, “than

DEBORAH KATES / THE NEW YORK TIMES / REDUX



George Naylor on his Churdan, Iowa, farm

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Naylor still looks the part of the hippie, and he rails endlessly against the establishment, despite the fact that, as he puts it, he grows “protein, carbohydrates, and oil”—some of it for the likes of the grain giant Cargill.

We climbed into Naylor’s rickety pickup truck and drove around to survey his fields and grain silos. “Now we’ll get to the good part,” he said, steering the truck off the tarmac and onto a bumpy path that ran between tall rows of corn. About a half-mile in, we arrived at a clearing, what Naylor referred to as his “restored wetland.” He cut the motor and motioned for me to get out, explaining how he’d quit planting corn out there and instead replanted the area with native grasses and wildflowers. It looked like the terrain up in the Prairie Pothole Region. He directed my attention to the cattails

and swamp smartweed and searched for some purple prairie clover, which he was determined to have me smell. Had I noticed the way our shoes were sinking down into the healthy soil? he wanted to know. As we climbed back into the truck, Naylor told me that he and his friends sometimes come out here in the evening with a couple of beers to watch the sun go down.

He talked about a book a friend used to have, featuring aerial photos of the region taken several decades earlier. It had been dotted with seasonal lakes, just like up in the Dakotas. He pointed out the windshield to the spot, indiscernible now amid the sea of corn, where his father would feed the ducks on his early-morning walk to school. Naylor recalled how he used to see groundhogs and jackrabbits around their home. Not anymore. “I haven’t heard a red-headed woodpecker in 20 years,” he said.

Over the past several months, corn and soybean prices have fallen from the record highs of 2012. But they are still steep enough to make a lot of people a lot of money. “The traditional way to get rich is to transfer your costs to someone else,” says one of the farmers I visited—whether to your neighbor, the taxpayer, or the generations that follow your own. While George Naylor’s little wetland is a sweet and peaceful place, to enjoy it requires a certain suspension of disbelief. One tiny oasis plunked down in a vast universe of corn can’t hope to achieve the diversity of our nation’s native prairie. Certainly not enough to draw back a redheaded woodpecker. ■

in AP’s story.” The Environmental Protection Agency is expected to announce its 2014 blending-level requirements in the spring.

JUST BEFORE LEAVING THE Midwest, I drove about 90 minutes northwest of Des Moines to visit with a corn and soy farmer named George Naylor. Bearded and dressed in denim overalls, he served me homemade pumpkin pie in the kitchen of his ramshackle farmhouse. A cantankerous 65-year-old, the native Iowan earned a degree from the University of California, Berkeley, before returning in 1976 to tend the farm his grandfather established in 1919.