## UNDER THE INFLUENCE OF ETHANOL

America's corn-based ethanol program carries high costs in fish, wildlife and tax dollars

## **By Ted Williams**

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Ethanol is even more popular now than when Americans made it to fuel themselves rather than their cars, and some of the behavior it generates is no less silly. The cornbelt, Congress and the departments of Energy and Agriculture are hawking the stuff as if it were Dr. Kickapoo's Elixir for Rheum, Ague, Blindness and Insanity. Bill Gates has invested \$84 million in it. In the last five years the amount of corn poured into ethanol distilleries has tripled to 55 million tons. At this writing, projections by the Department of Agriculture have world grain use growing by 20 million tons in 2006, 6 million tons of which will be consumed by the world's rapidly proliferating and hungry human beings, 14 million tons of which will be consumed by America's proliferating and gas-guzzling cars. Eighteen percent of all the corn we grow goes into ethanol production, and goals mandated by Congress will sharply increase that percentage.

It all started in 1990 with amendments to the Clean Air Act, revolutionary in that they regulated not just how we burn gasoline but how we make it. In areas out of compliance with air-pollution standards, gasoline had to include at least two percent oxygen-containing chemicals (oxygenates), the better to combust carbon monoxide, toxic hydrocarbons, and smog-producing volatile organic compounds. There were only two choices--ethanol and the petroleum-based methyl tertiary butyl ether (MTBE). This was precisely what the cornbelt had fantasized about and lobbied for. Suddenly the moribund ethanol industry had a future. City air would become breathable. We'd have plenty of fuel. It was going to be a win-win-win.

But instead of cleaning up America, ethanol has added to the mess we're making out of our water and air. Now the Bush Administration has decreed that ethanol replace the far more efficient MTBE as an oxygenate. But with current refining technologies and anti-pollution paraphernalia on motor vehicles there's no need for any oxygenate, a fact the powerful agribusiness lobby doesn't want you to know. Under its withering pressure, Congress and the executive branch have committed the nation to ethanol as both oxygenate and fuel.

The Energy Policy Act of 2005 requires that US gasoline contain 7.5 billion gallons of ethanol by 2012, up from 4 billion. One hundred and one ethanol plants are online, and 44 are under construction. Eighty million US acres were planted to corn in 2006; and the ethanol boom will require 10 million more just in 2007. Ethanol, we are being told, is going to "reduce our dependence on foreign oil" and "lead us to energy independence." "Live Green, Go Yellow," effuses General Motors, one of the major roadblocks to fuel-efficiency standards. "Fill Up, Feel Good," gushes the Ethanol Promotion and Information Council, a front for agribusiness.

How will ethanol affect your fishing, apart from possibly ruining your outboard motor? (Ethanol does this in lots of ways. Just ask David Blinken, the famous Montauk fly-fishing guide, who recen-tly spent \$25,000 pulling his deck, replacing his fuel lines and tank, extracting aluminum-oxide gum from his carburetors and basically rebuilding his twin 100-horse Yamahas.) First, no crop grown in the United States consumes and pollutes more water than corn. No method of agriculture uses more insecticides,

more herbicides, more nitrogen fertilizer. Needed for the production of one gallon of ethanol are 1,700 gallons of water, mostly in the form of irrigation taken from streams either directly or by snatching the water table out from underneath them. And each gallon of ethanol produces 12 gallons of sewage-like effluent.

Ethanol plants are gross polluters of air and water, and because of the exorbitant price of natural gas some of the new ones will be coal-fired, adding to the already dangerous mercury content of fish. The response of the Bush administration has been a proposal to relax pollution standards for ethanol production. Under the conservation programs of the 1985 Farm Bill and its successors, some farmers are bootstrapping their way toward sustainable agriculture, but corn production still erodes topsoil about 10 times faster than it can accrete.

The toxic, oxygen-swilling stew of nitrates, chemical poisons and dirt excreted from the corn monocultures of our Midwest pollutes the Mississippi River and its tributaries, limiting fish all the way to the Gulf where it creates a bacteria-infested, algae-clogged, anaerobic "Dead Zone" lethal to fish, crustaceans, mollusks and virtually all gill breathers. In some years, depending on seasonal heat and water conditions, the Dead Zone can cover 8,000 square miles. And it's expanding.

No habitat is more important to fish and wildlife than wetlands. They filter out pesticides and sediments, and they consume phosphates and nitrates. At least 70 percent of the wetlands in the combelt have already been lost. But, in order to produce surplus corn for ethanol, remaining combelt wetlands are being drained. In some areas--Nebraska, for instance--corn has to be irrigated by pumps that suck water from the ground faster than it percolates back in. Both pumps and the ethanol plants themselves are powered by natural gas, the frenzied production of which is creating horrendous problems for fish and wildlife in the West.

Where is the land to grow all the extra corn needed for ethanol supposed to come from? Well, the Bush administration has an idea: In testimony to Congress, the USDA's chief economist, Keith Collins, has raised the possibility of using land enrolled under the Farm Bill's Conservation Reserve Program (CRP). Not so coincidentally, it happens that this is precisely the idea that the corn lobby had come up with. In an op-ed in the December 6, 2006 Des Moines Register Bruce Rastetter, CEO of Hawkeye Renewables, Iowa's largest ethanol producer, writes: "First, the government should immediately release some of the 37 million acres that now sit idle in the US Department of Agriculture's Conservation Resources [sic] Program."

"We're hearing rumors every day that the [USDA's] Farm Services Agency is on the verge of announcing they're going to allow people to liquidate CRP contracts to grow more corn for ethanol," says Julie Sibbing, point person for the National Wildlife Federation's agriculture and wetlands program. "That's a huge concern. They've been studying CRP to see if there's land they can pull out to grow more corn. We're hearing from folks up in the plains that farmers are going in and breaking up virgin prairie. It's lousy land for agriculture, but they're planting it because of the high price of corn brought on by this ethanol boom. It's scary. And there are huge water requirements. People are building these ethanol plants anywhere, paying no attention to the water needs. We're worried about instream flows."

CRP--originally conceived not for the benefit of fish, wildlife or soil but simply to reduce surplus, government-subsidized corn--has restored two million acres of wetlands and adjacent buffers, produced 7.1 million acres of new native grasses, protected 170,000 miles of streams, restored 1.2 million acres of rare and declining wildlife habitat and saved 450 tons of soil (enough to fill 37.5 million dump trucks).

What's more, CRP annually produces 15 million pheasants and 2.2 million ducks and sequesters 48 million tons of carbon dioxide. It is absurd to suggest we can't afford CRP. The increased soil productivity it has provided is worth \$162 million a year, increased waterfowl hunting \$122 million, increased wildlife viewing \$629 million, and runoff reduction \$392 million.

Thanks to CRP and other Farm Bill conservation programs, Iowa--the corn capital of the nation--is suddenly teeming with smallmouth bass and, in the state's northeast hill country, wild trout. Yes, wild trout. "Our trout fishery is one of the best kept secrets in the country," declares Rich Patterson, who directs the Indian Creek Nature Center in Cedar Rapids and serves on the Circle of Chiefs of the Outdoor Writers Association of America. "When I first came here 28 years ago it was all put-and-take, guys tossing corn to stupid hatchery trout. I'm catching incredible wild trout in streams that were mucky in the 1980's. And there has been a tremendous turnaround on smallmouths. They're sight feeders, and with clearing water they're increasing like crazy."

Marion Conover, chief of fisheries for the Iowa Fish and Wildlife Division, confirms Patterson's assessment. "The smallmouths are a reflection of improved clarity in our streams because of buffer strips and best management practices funded through the Farm Bill's conservation title," he says. "We manage four stream segments as catch-and-release for smallmouth--on the upper Iowa, Cedar River, Middle Raccoon, and Maquoketa. These are higher-quality streams, but we've seen smallmouths improve in places like the Mississippi River, parts of the Des Moines River, and the Missouri River in the Sioux City area of all places. It's simply a function of less dirt in the water. But there's a concern among the whole environmental community about what bodes for the future, what our landscape is going to look like next year or five years from now."

The Iowa brookies are a national treasure, genetically distinct from Yankee brook trout, Appalachian brook trout and even fish from Wisconsin and Minnesota. In 1980 only one of the state's streams had native brook trout reproduction, and only four had brown trout reproduction. Today there are at least 23 with self-sustaining browns and six with self-sustaining native brookies. The division's northeast fisheries supervisor, Bill Kalishek, expects that by the time you read this, new survey results will have significantly increased these numbers. And if Farm Bill programs remain intact, streams where there is now only sporadic reproduction will become self-sustaining. The brookies are small, but the browns are huge in relation to the little spring creeks in which they abide. Kalishek reports that 15- to 20-inchers are not unusual, and he's seen them up to 28 inches. "The unglaciated terrain here in northeast Iowa is highly erodible," he told me. "So cropland is very eligible for CRP. That program has taken a lot of the most highly erodible land out of row-crop production and reduced the amount of sediment getting washed into the streams. Not only has the water quality improved, so has the substrate quality for spawning."

But America's ethanol orgy frightens Kalishek and his colleagues. "I've seen some of the results already," he says. "The bulldozers are out there on the little corners of cornfields that used to be brushy draws or old fence lines so farmers can grow more corn. A lot of our general-signup CRP enrollments--where whole, erodible fields were taken out of production--are expiring in the next two or three years. And I'm worried that with this increase in corn production we're going to take a big step backwards in water quality and stream habitat and in our trout populations."

Well, as we so frequently tell ourselves and are told by our federal government, we all have to make sacrifices for energy self-sufficiency. But the sacrifices fish-and-wildlife advocates and taxpayers are

being asked to make for ethanol do not and cannot decrease our dependency on foreign oil. In fact, they do just the opposite. This is because it takes more energy in the form of fossil fuels to make corn-based ethanol than we get from it.

Some researchers dispute this, but almost without exception they are directly or indirectly funded by or otherwise allied to agribusiness or the USDA (a wholly owned subsidiary of agribusiness). The credible stats issue from independent researchers whose studies have been published in peer-reviewed scientific journals and who have no irons in the fire. Two of the more notable ones are Dr. Tad W. Patzek, a chemical engineer from the University of California at Berkeley, and Cornell University's Dr. David Pimentel.

Pimentel, author of 24 books and nearly 600 scientific papers and selected by the Department of Energy to chair two scientific panels on ethanol production, told me this: "Ethanol is a boondoggle. Optimistically, using Department of Energy numbers, it amounts to one percent of our petroleum use. Ethanol requires almost 40 percent more energy to produce than you get out of it; we're having to import oil to make this stuff. And, of course, the environmental impacts to water, air and soil are enormous. During the fermentation process, when yeast is working on the starches and sugars, large quantities of carbon dioxide are released. In fact, some plants collect it and sell it to beverage companies. So it's a double whammy for global warming--not only burning fossil fuel but carbon dioxide production."

Pimentel reports that ethanol, which yields only two-thirds the energy of gasoline, gets 45 times more federal subsidy per gallon than gasoline. "That's what's attracting all the flies," he says. All told, you and I are spending at least \$3 per gallon on ethanol subsidies for a total of \$6 billion per year. Without all this gravy train, Pimentel has calculated that the cost for 1.33 gallons of ethanol (the equivalent in energy yield to a gallon of gasoline) would be \$7.12.

The subsidies aren't going to family farms but to bloated, effluent-spewing agribusiness giants that get hungrier and dirtier with each feeding. According to one estimate--by financial analyst James Bovard of the Cato Institute--every dollar in profits earned by the nation's largest ethanol producer, Archer Daniels Midland (ADM), costs taxpayers \$30.

In February 2006 Energy Secretary Sam Bodman showed up at ADM's Decatur, Illinois, headquarters to pose with CEO Allen Andreas and announce that the Department of Energy would offer \$160 million for the construction of three biorefineries for ethanol production. "This funding will support a much-needed step in the development of biofuels and renewable energy programs," declared Bodman. "Partnerships with industry like these will lead to new innovation and discovery that will usher in an era of reduced dependence on foreign sources of oil, while strengthening our economy at home."

This is the same ADM that made it to number 10 on the University of Massachusetts' Political Economy Research Institute's "Toxic 100" list of America's worst corporate polluters, the same ADM that in 2003 was assessed \$351 million in fines by the EPA for Clean Air Act violations at 52 plants in 16 states, the same ADM currently slugging it out with the state and feds in 25 judicial and administrative proceedings regarding its contamination of air, soil and water.

ADM is just one of many offenders. Another example: in June 2006 Ace Ethanol LLC of Stanley, Wisconsin, and John S. Olynick Inc. of Gilman, Wisconsin, (an excavating company) agreed to pay \$61,000 after they'd been cited for filling wetlands adjacent to a tributary of the Wolf River. And Ace has been ordered by Wisconsin's attorney general to pay \$300,000 in fines for Clean Air Act violations.

"I've been following this ethanol development very closely," says Iowa Fish and Wildlife's Kalishek. "And I have one hope--biomass ethanol. If we can get plants shifted over to biomass [cellulosic ethanol derived from wood chips, straw, hemp, crop stalks, etc.], we could have farmers growing something like switchgrass [one of the native prairie covers approved for CRP enrollment]. Then we wouldn't have to worry about erosion. There'd be many benefits for fish and wildlife and water quality. But it looks like the demand for corn for ethanol is going to continue to increase. Every prediction I've seen, and the most recent one came out of Iowa State University, is that demand for corn is going to outstrip Iowa's ability to produce corn. If you've ever driven across our state, you'd scratch your head and say, 'Huh? All that corn is not going to be enough to feed the ethanol plants?'"

The National Wildlife Federation shares Kalishek's hopes and fears. "We're working on a program for the next Farm Bill that would try to advance the whole next generation of technologies like switchgrass ethanol," says Sibbing. "A couple [cellulosic] plants are being built now--one in Iowa and one in Idaho. If we get to cellulosic ethanol, we can produce something like five times more per acre. It would be a lot better for land and water and a produce a lot more bang for the buck."

Switchgrass is certainly attractive to burn directly as a biomass fuel; and one day, perhaps, it will be an ethanol source. Because it is harvested in early spring or late summer or fall, declining ground-nesters such as quail and bob-o-link that fledge their broods in late spring would benefit. Switchgrass requires essentially no fertilization; and it's a perennial, which means there's no tilling, reseeding or erosion.

But, warns Cornell's Pimentel, cellulosic ethanol is far more difficult to produce than corn-based ethanol, which itself isn't practical or economical. "There are only about half as many starches and sugars in woody material and straw as in corn," he explains. "There are also extra steps. You have to use an acid or enzyme to release the cellulose from the lignin--the stuff that holds the plants up straight. If you use acid, you have to stop the acidity process with an alkali. So that's another step. You hear stories from pro-ethanol people that the lignin (about 25 percent of the wood) can be used for fuel, but that's if it's dry. It's dissolved in water, and to dry it takes a good deal of energy."

Ethanol rendered from crop stalks is no less problematical. And any major commitment to that source could be even more environmentally hurtful than corn-based ethanol by spiking already gross erosion rates.

So, until we figure out how to make ethanol cheaply and efficiently from native prairie perennials like switchgrass, where are we going to find the fuel to run our cars? Berkeley's Dr. Tad Patzek makes the point that corn is merely one way of converting solar energy to fuel. Solar cells, far more efficient, could make hydrogen fuel. That's where the subsidies need to go, he contends. But technology for practical, affordable hydrogen fuel, like technology for practical, affordable ethanol fuel, doesn't exist yet.

We do, however, possess the technology to build fuel-efficient automobiles. In the current charade designed by and for agribusiness we're allocating 18 percent of the corn we grow to ethanol, thereby cutting our petroleum consumption by one percent. But Patzek has calculated that if we doubled automobile fuel efficiency, we'd cut petroleum consumption by 33 percent or, put another way, we'd increase our petroleum supply by a third. It's a revolutionary concept that America has never tried. Fish-and-wildlife advocates are calling it conservation.