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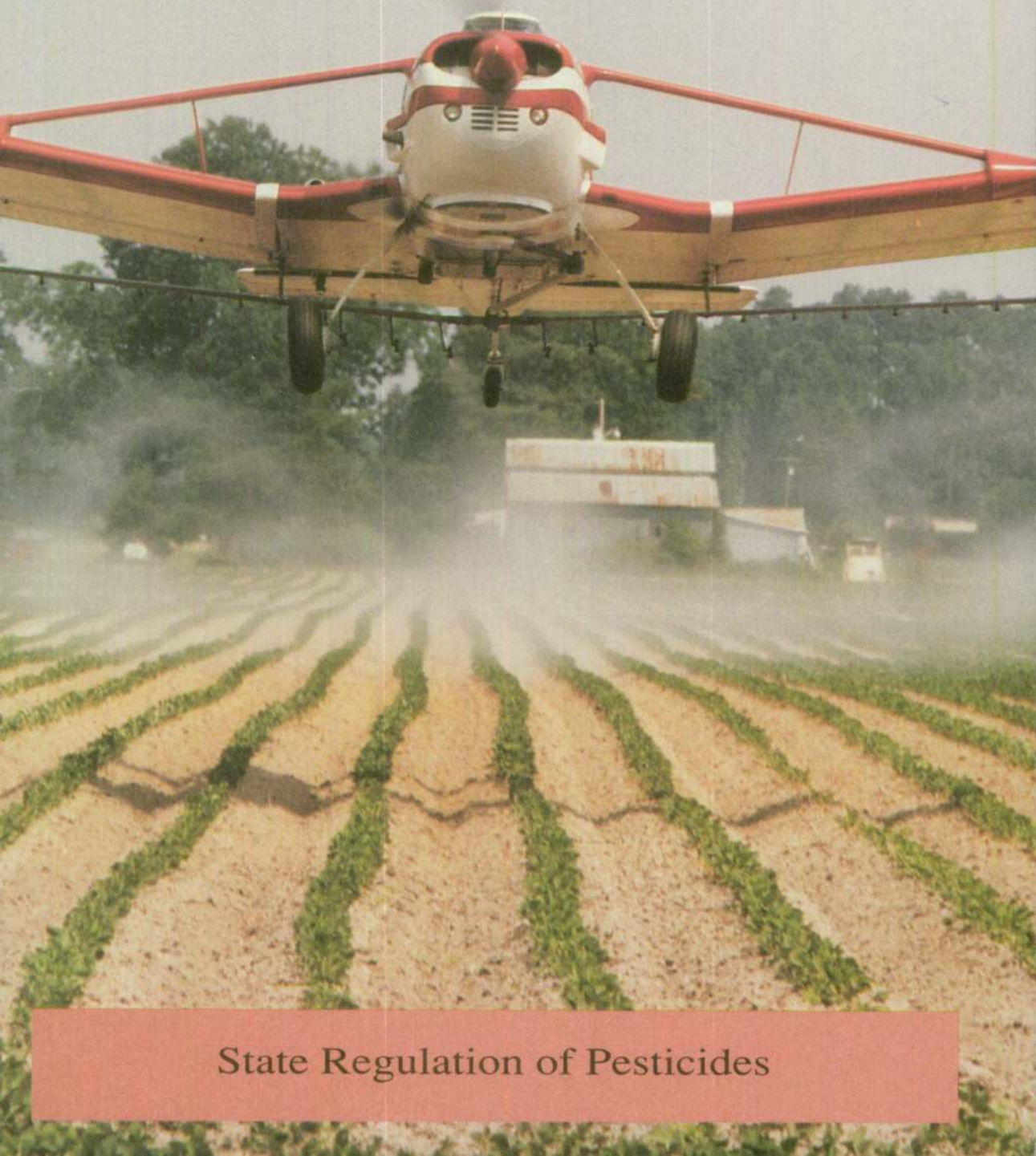

State Regulation of Pesticides

N.C. Center for Public Policy Research

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The Center was formed in 1977 by a diverse group of private citizens "for the purpose of gathering, analyzing, and disseminating information concerning North Carolina's institutions of government." It is a nonpartisan organization guided by a self-elected Board of Directors and has individual and corporate members across the state.

Center projects include the issuance of special reports on major policy questions; the publication of a quarterly magazine called *North Carolina Insight;* joint productions of public affairs television programs with the University of North Carolina Center for Public Television; and the regular participation of members of the staff and the Board in public affairs programs around the state. An attempt is made in the various projects undertaken by the Center to synthesize the thoroughness of scholarly research with the readability of good journalism. Each Center publication represents an effort to amplify conflicting ideas on the subject under study and to reach conclusions based on sound rationalization of these competing ideas.

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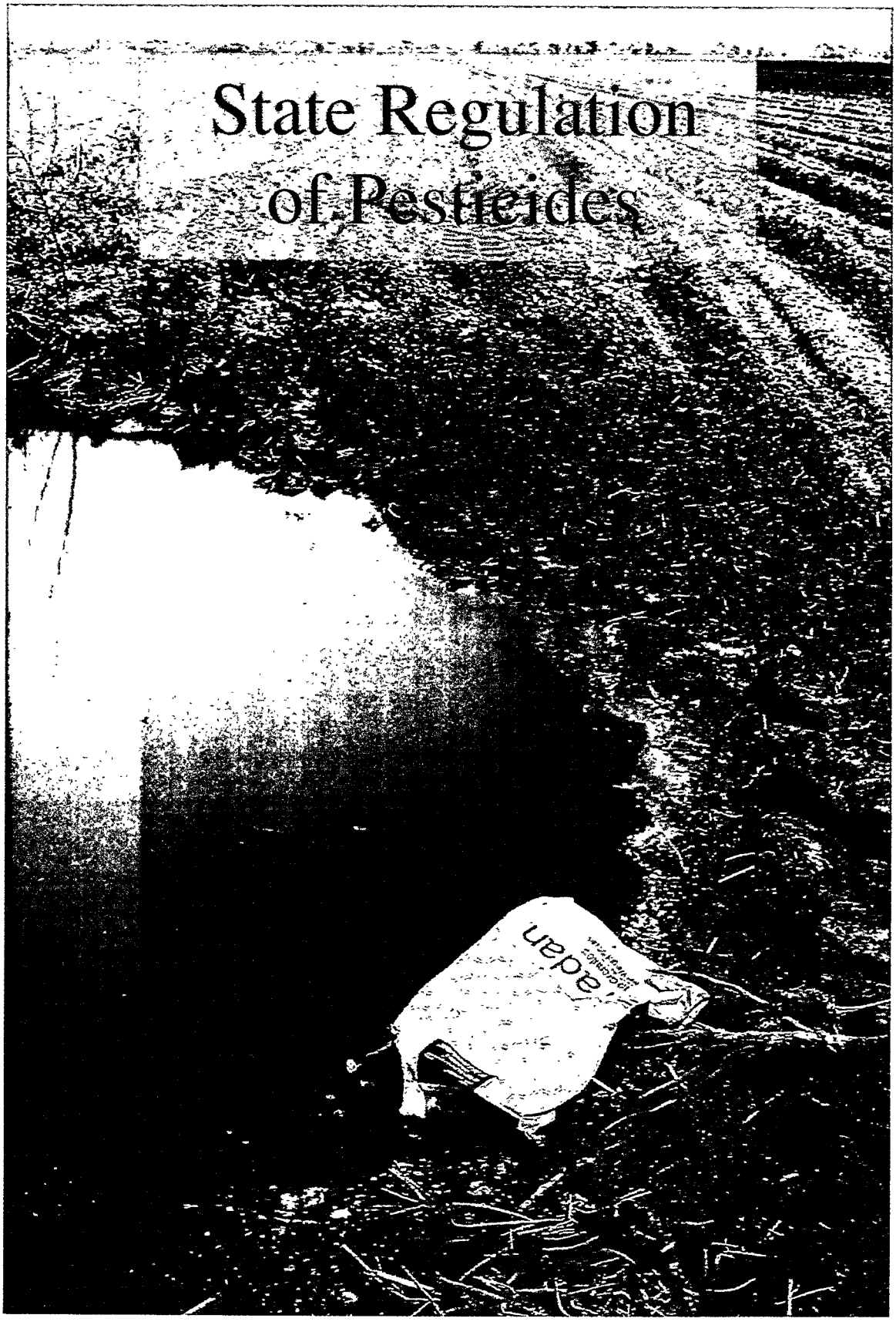
State Regulation of Pesticides



Ken Taylor, N.C. Wildlife Resources Commission

I
Pesticide Regulation: An Overview

by Tom Mather

Pesticides, like medicinal drugs, are chemicals that can provide substantial benefits while posing serious potential hazards. Pesticides have important uses in increasing crop production, curbing insect-borne diseases, and preventing pest damage to buildings, food, and stored products. But the inherent toxicity of many pesticides can cause health problems and damage the environment. The dual nature of pesticides is reflected in current laws, which direct government agencies to weigh the benefits against the hazards of pesticides when regulating their use.

Pesticide use has been one of the focal points of the environmental movement ever since the publication of *Silent Spring* in 1962. The landmark book by biologist Rachel Carson warned that unrestricted use of pesticides could result in widespread damage to the environment and human health.[1] Her warnings, backed up by extensive research, have provided the impetus for major revisions of federal and state pesticide regulations since the early 1970s.

Now, more than 30 years after the publication of *Silent Spring*, where does pesticide regulation stand in North Carolina? The N.C. Center for Public Policy Research tried to answer that question by focusing on several more specific questions: How much pesticide use occurs in North Carolina and where is its use the highest? How does North Carolina regulate pesticides, and how does its program compare with those in other states? What types of pesticide users account for the most complaints and regulatory actions? Are pesticides more effectively regulated through agricultural or environmental agencies?

The Center spent nearly two years of study trying to answer those questions. In doing so,

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Center staff reviewed scores of previous studies on pesticides, interviewed dozens of pesticide authorities, analyzed five years of state enforcement records, and surveyed pesticide administrators in all 50 states.

This article provides an overview of the uses, benefits, environmental hazards, and health risks of pesticides. It also summarizes past and current federal regulation of pesticides. A second article, "Searching for Hens' Teeth: Information Scarce on Pesticide Usage," discusses the amounts of pesticides being used in North Carolina and the United States and examines record-keeping requirements for applicators. A third article, "Enforcement of Pesticide Regulations in North Carolina," reviews the state's pesticide enforcement programs and looks at violations of those regulations. A fourth article, "How North Carolina Stacks Up Against Other States in the Regulation of Pesticides," presents the results of the Center's 50-state survey of pesticide programs. In a concluding article, the Center makes recommendations for improving pesticide regulation in North Carolina. Interspersed among these main articles are several shorter pieces dealing with specific issues such as organic farming, integrated pest management, aerial application of pesticides, exterminator treatments, groundwater contamination, and farmworker training.

What Are Pesticides?

Generally speaking, pesticides are substances used to kill, limit, or control pests.[2] But pests can mean many things to different people. To a farmer, pests can include insects, mites, slugs, fungi, and nematodes that damage crops; weeds that compete with crops for moisture and nutrients; rodents that eat seeds or bark from fruit trees and stored grains; and birds that eat newly planted seeds and seedlings.

To a homeowner, pests can include roaches, flies, mosquitoes, and other annoying insects; moths that can destroy sweaters and other woolen clothes; termites that can eat away the wooden structure of a house; crabgrass and other weeds in lawns and vegetable gardens; mildew that tarnishes bathrooms and basements; aphids, slugs, and other pests that attack ornamental plants and vegetables; rats and mice that litter attics and storage rooms; fungi that rot timbers used to support homes and decks; and algae that turn ponds and swimming pools green. Likewise, a wide range of pests can spell trouble for businesses, hospitals, and government agencies.

Pesticides include three major classes, defined by the pests they control. **Insecticides** control insects such as aphids, beetles, mosquitoes, cockroaches, termites, fleas, and caterpillars. **Herbicides** control weeds such as crabgrass, chickweed, Bermuda grass, and nutgrass. **Fungicides** control fungi such as molds, mushrooms, mildews, and rusts. Those three classes account for 93 percent of the pesticides used in the United States, according to the U.S. Environmental Protection Agency. (See Figure 1 on p. 5.)

A variety of other pesticide types account for the remaining 7 percent, including: **rodenticides** for controlling rats and mice; **nematicides** for controlling nematodes (small worms that attack plants); **miticides** for controlling mites (small spider-like pests); and **algacides** for controlling algae (microscopic plants that can clog rivers, lakes, and swimming pools). For regulatory purposes,

Never again need there be a disaster like the famine in the 1840s in Ireland that was caused by a fungus, Fusarium, the late potato blight. That catastrophe led to the death of one third of Ireland's population from starvation, another third emigrated, and the bitterness that exists between the Irish and the English was intensified yet further. How much of the tragedy of the Emerald Isle might have been averted if a good fungicide like captan had been available?

—Dixy Lee Ray, Former Governor of Washington
from *Trashing the Planet*

Can anyone believe it is possible to lay down such a barrage of poisons on the surface of the earth without making it unfit for all life? They should not be called 'insecticides,' but 'biocides.'

—RACHEL CARSON, *SILENT SPRING*

the "other" category also includes various agricultural chemicals that the EPA classifies as pesticides but aren't used to kill pests. These include chemicals such as **plant growth regulators** that keep crops like tobacco from producing unwanted flowers; **ripening agents** that speed up or slow down the ripening of fruits and vegetables; and **defoliants** that make plants drop their leaves to ease the harvesting of crops like cotton.

Not surprisingly, the wide range of pest problems and uses has prompted the development of a dizzying array of pesticide products. Manufacturers currently produce about 20,000 pesticide products containing some 900 active ingredients.[3] In North Carolina alone, there were 12,391 pesticide products registered by the state Department of Agriculture in 1992.[4]

The Benefits of Pesticides

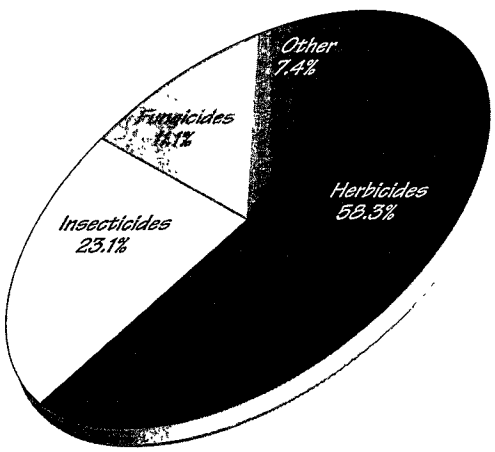
The large number of pesticide products is just one indication of their economic importance. Another indication is pesticide sales. More than $8 billion worth of pesticides were sold in the United States in 1991, representing about one-third of the world market.[5] Three-fourths of the pesticide usage in the United States is for agriculture,[6] and some studies have estimated that every dollar spent on pesticide control returns about $4 in crops saved.[7]

Pests destroy about one-third of the world's food crops during growth and storage.[8] In the United States, pests destroy at least 30 percent of the crops—totaling about $30 billion a year—despite the heavy use of pesticides and other control methods. Agricultural studies have found that pesticide use can increase crop yields up to nearly 80 percent,[9] although some studies have concluded that farmers could cut their use in half without reducing yields.[10]

"Were it not for herbicides, we would still have 10 to 12 percent of our population working on farms, instead of the present 2 percent," writes George Ware, an entomology professor at the University of Arizona. "Today's farms would quickly become perpetuating weed fields that would require tremendous levels of our human energy. Indeed, it has been estimated that more energy is expended on the weeding of crops than on any other single human task."[11]

The benefits of pesticides go far beyond their value for agriculture. They also have important health benefits in controlling diseases, improving nutrition, and preventing starvation.[12] Pesticides have been particularly important in reducing insect-borne diseases such as malaria, typhus, plague, cholera, and yellow fever. For example, the incidence of malaria in India dropped from about 100 million cases a year in the mid-1930s, before pesticides were used to control mosquitoes, to about 150,000 cases a year by the mid-1960s.[13] The role of pesticides in increasing food production has helped improve people's diets by making fruits, grains, and vegetables more available and less expensive, thus helping avoid widespread famines around the world.[14]

Figure 1.
Percentage of Pesticide Use in the United States by Class of Chemicals, 1991



Source: U.S. Environmental Protection Agency

Other societal benefits from pesticides include: increased production of timber and fiber crops; prevention of storage losses from spoilage and rodent damage; protection of buildings from termites and fungal rot; pest control for lawns, gardens, nurseries and greenhouses; control of unwanted vegetation along highways and utility rights-of-way; and quality-of-life improvements through the control of everyday pests such as cockroaches, fleas, mosquitoes, rats, and mice.

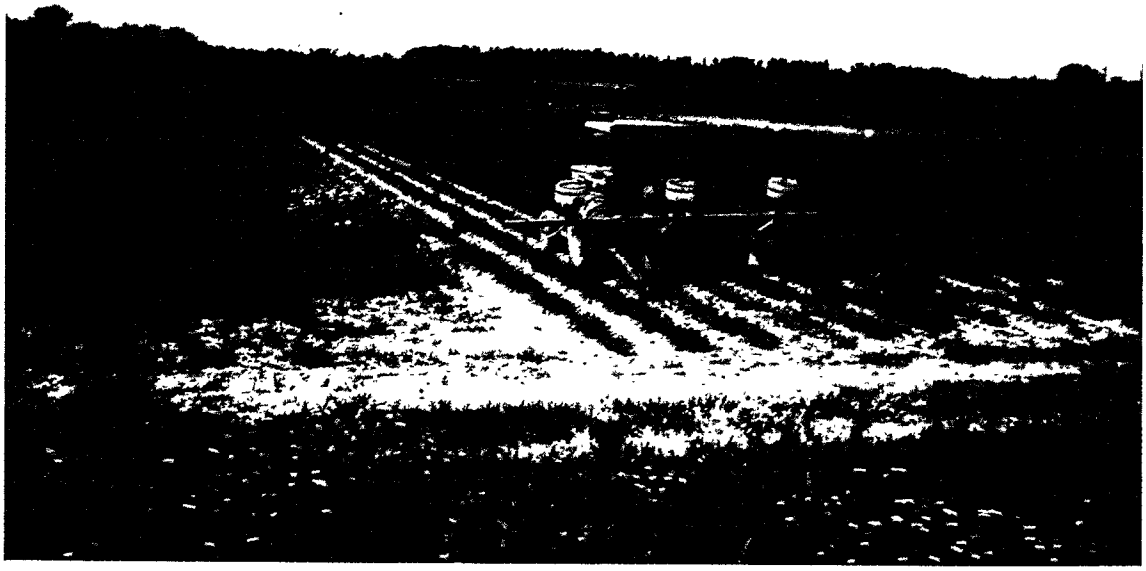
"When millions of humans are killed or disabled annually from insect-borne diseases and world losses from insects, diseases, weeds, and rats are estimated at $100 billion annually," Ware writes, "it becomes obvious that control of various harmful organisms is vital for the future of agriculture, industry, and human health. Pesticides thus become indispensable in feeding, clothing, and protecting the world's population, which will approach 6.4 billion by the year 2000."[15]

The Hazards of Pesticide Use

The wide range of benefits from pesticides has led to an explosion in their usage over the past 50 years. In the United States alone, pesticide use has grown 33-fold since 1945.[16] However, total production has declined about 10 percent since peaking at 1.2 billion pounds in 1981. That decline has been due to rising chemical costs, the production of more potent pesticides that are effective in smaller quantities, the development of more pest-resistant crops, and the use of farming techniques that lessen the need for chemicals.[17] Another factor has been increasing awareness of the hazards of pesticides.

As Rachel Carson pointed out in the early 1960s, most pesticides were developed for a single purpose—to kill living organisms—and their use can have unintended consequences. "These sprays, dusts, and aerosols are now applied almost universally to farms, gardens, forests, and homes—nonselective chemicals that have the power to kill every insect, the 'good' and the 'bad,' to still the song of birds and the leaping of fish in the streams, to coat the leaves with a deadly film, and to linger on in soil—all this though the intended target may be only a few weeds or insects. Can anyone believe it is possible to lay down such a barrage of poisons on the surface of the earth without making it unfit for all life? They should not be called 'insecticides,' but 'biocides.'"[18]

A farmer applies granular pesticides to a peanut field in Northhampton County.



Tom Mather

The toxicity and other dangers of pesticides have implications for the environment as well as human health. A team of scientific authorities, directed by the Environmental Protection Agency to assess the relative hazards of some 30 environmental problems, ranked pesticides as a high risk with regard to potential health and ecological effects.[19] David Pimentel, an entomology professor at Cornell University, has estimated that the environmental and social costs of agricultural pesticide use total at least $8 billion a year in the United States—about half the amount that pesticides save in crop production each year.[20] That study considered costs from human health effects; domestic animal poisonings; losses of fish, birds, bees, and other wildlife; surface and groundwater contamination; unintended crop damage; greater pest control expenses resulting from the destruction of natural enemies and the development of pesticide-resistant bugs; and increased funding for government regulation and pollution control.

These insecticides are not selective poisons; they do not single out the one species of which we desire to be rid. Each of them is used for the simple reason that it is a deadly poison. It therefore poisons all life with which it comes in contact: the cat beloved of some family, the farmer's cattle, the rabbit in the field, and the horned lark out of the sky.

—Rachel Carson,
Silent Spring

Much of the environmental damage from pesticides results from their nonselectivity. As Rachel Carson put it, pesticides often kill the good with the bad. For example, an insecticide that kills aphids also can destroy bees, ants, and other beneficial insects that are essential for pollinating many fruits and vegetables. Insecticides also can kill ladybugs and other insects that prey on pests, leading to a "rebound" effect. Although spraying initially knocks out most pests, those that survive can come back in even greater numbers because their natural predators have been eliminated. Thus, farmers are forced to repeat pesticide applications, sometimes at higher rates.

A related problem is the development of chemical-resistant pests. That is, some insects with high reproductive rates can evolve strains that are no longer susceptible to certain pesticides—similar to bacteria that develop drug-resistant strains. As a result, farmers can be forced to spray at higher application rates or use more toxic chemical alternatives.

The nonselectivity of many pesticides has other consequences as well. They can kill birds, fish, and other animals when sprays drift off-target during aerial applications, when wildlife feed in newly treated fields, and when storm runoff washes pesticide residues into streams, lakes, or coastal waters. Those effects can be particularly serious with pesticides that don't break down readily into non-toxic forms. Such persistent pesticides can build up as they are passed along the food chain, a process known as **biological magnification.**

Perhaps the best-known example of biological magnification relates to the chemical DDT, one of the most widely used insecticides of the 1950s and 1960s.[21] DDT, although relatively non-toxic to humans, had accumulated to high concentrations in many predatory animals by the late 1960s. That apparently led to the near extinction of many birds of prey—such as bald eagles, ospreys, and pelicans—because DDT caused their egg shells to thin and break, thus preventing them from reproducing. The populations of most predatory birds have rebounded sharply since the Environmental Protection Agency banned DDT in 1973,[22] although some scientists attribute the recovery to wildlife management policies rather than the DDT ban.[23]

Another hazard with pesticides is that they can contaminate drinking water supplies by seeping into groundwater and washing into streams and lakes. Groundwater contamination is particularly serious because cleaning it up can be very difficult, time-consuming, and expensive. It also could have potential health effects for large numbers of people. Wells supply drinking water to more than half of the total population and virtually all of the rural population—in North Carolina as well as the United States as a whole.[24]

Groundwater tests have found traces of pesticide residues in wells from nearly every state, including North Carolina.[25] In a 1990 study, the

U.S. Environmental Protection Agency estimated that 4.2 percent of the nation's 10.5 million rural domestic wells and 10.4 percent of the 94,600 community water system wells contained detectable amounts of one or more pesticides.[26] The EPA estimated that less than 1 percent of those wells contained pesticides at levels exceeding recommended health standards.

A more recent study found pesticide contamination in 16 percent of the wells tested at 139 farms in Eastern North Carolina from 1989–1992. "The only reasonable conclusion is that pesticides are getting into groundwater because of routine applications," says Richard P. Maas, who directed the study by researchers at the University of North Carolina at Asheville.[27] But that study's methodology has been harshly criticized by state agriculture and environmental officials, who are in the process of setting up a statewide system for monitoring groundwater contamination in North Carolina.[28]

The state monitoring program eventually will test water from more than 150 wells in 65 of North Carolina's 100 counties, focusing on areas with vulnerable groundwater supplies and large amounts of agricultural production. Preliminary tests have found detectable amounts of pesticides in six of the 97 wells (6 percent) sampled so far, with levels in two wells exceeding recommended health standards.[29] Authorities plan to complete the study by April 1995. (See the accompanying story, "Pesticide Taints Neighborhood's Drinking Water," on pp. 11–13, for an account of how contaminated groundwater can affect a community. Also see the article, "Contaminated Wells, Odor Problems Sometimes Result from Exterminator Treatments," on pp. 16–18.)

"Exaggerating the risks from manmade substances, ignoring the natural world, and converting the issue to one of blaming U.S. industry does not advance our public health efforts. If we spend all our efforts on minimal, rather than important, hazards, we hurt public health."

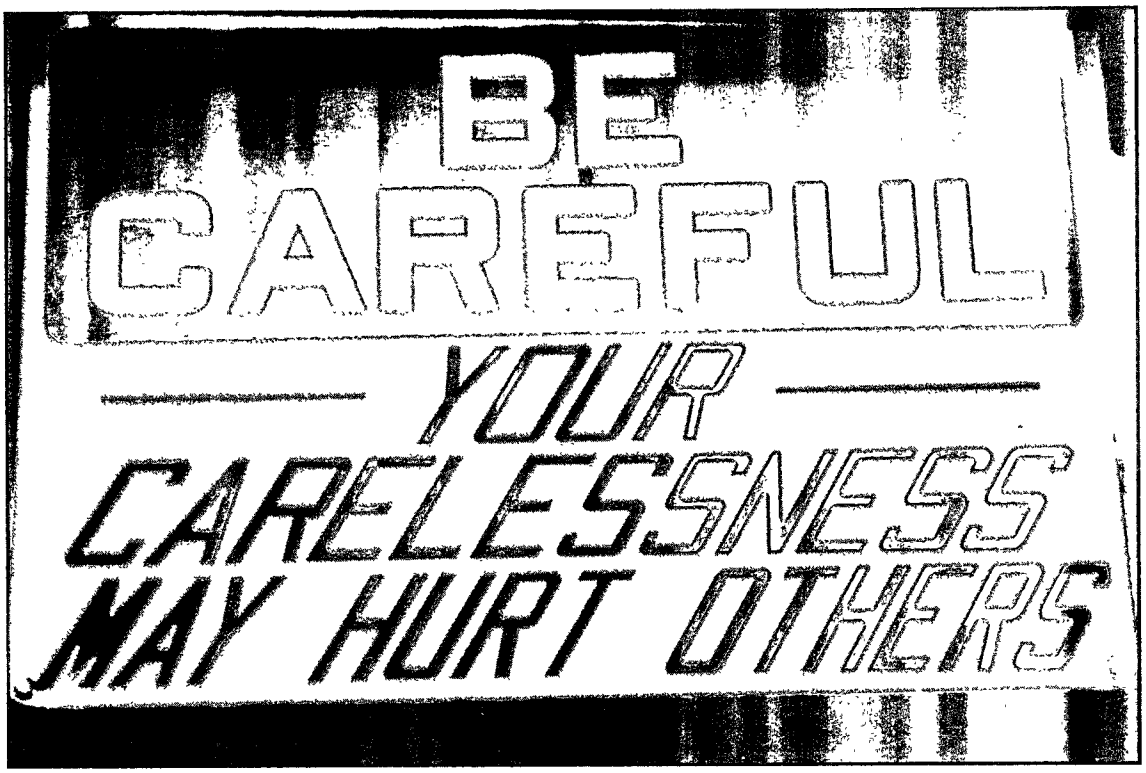
—Bruce Ames, Biochemist
University of California at Berkeley

Health Effects of Pesticides Vary Widely

With thousands of different pesticide products, it's hard to generalize about their health hazards. Some pesticides are highly poisonous, while others are less toxic than many commonly used substances such as table salt and aspirin. Generally speaking, insecticides are most toxic to humans, followed by herbicides and fungicides—but there are many exceptions. The method of exposure also is important: pesticides generally are more toxic when swallowed than when breathed or absorbed through the skin. And, as with any potential poison, the toxicity depends on the dosage and length of exposure.[30]

When discussing health hazards, it's important to distinguish between acute and chronic effects. *Acute effects* are those caused by short-term exposures to toxic chemicals, with symptoms usually appearing relatively quickly. Pesticide exposures can cause a range of acute effects, including nausea, dizziness, shortness of breath, skin rashes, and in extreme cases—blindness, poisoning, and death. In 1991, pesticides caused 84,283 poisonings, or 4.6 percent of the total human poison exposures reported to the American Association of Poison Control Centers. Pesticide poisonings caused 22 deaths in 1991, or 1.7 percent of the total for all reported fatal poisonings.[31] (Figures for North Carolina are not available because the state does not require doctors and hospitals to report pesticide-related health problems.) Most pesticide poisonings that result in death involve suicides or accidental ingestion by young children.[32]

Chronic effects are those that result from repeated or long-term exposures to chemicals such as pesticides. Laboratory studies of animals have linked various pesticides to a wide range of chronic conditions, including cancer, birth defects, nerve damage, reproductive disorders, immune-system defects, and lung, liver, and kidney damage.[33] Much of the concern about chronic effects has focused on cancer. One-third of the pesticides in use contain chemicals that are known or suspected causes of cancer, according to the Environmental



Tom Mather

Safety sign posted at a pesticides dealer in Greenville.

Protection Agency, which estimates that those pesticides cause 6,000 deaths a year in the United States.[34] A recent study by the National Research Council concluded that children may be more susceptible than adults to long-term pesticide exposure,[35] while other studies have suggested a link between breast cancer and certain organic pesticides.[36]

Some researchers, however, contend that the chronic health hazards of pesticides—at the levels most people are exposed—have been greatly exaggerated. For instance, Bruce Ames, a biochemist at the University of California at Berkeley, says that laboratory studies often overstate pesticides' cancer-causing potential because they are based on exposing rats and mice to levels of chemicals far higher than most people ever encounter. In addition, Ames says that many common foods and drinks that people consume every day—including apples, bananas, cabbage, coffee, mushrooms, and oranges—contain *natural* substances with far greater cancer-causing potential than the trace levels of pesticide residues typically found on food.

"We estimate that Americans eat about 1,500 mg/day of natural pesticides, 10,000 times more than manmade pesticide residues, which FDA estimates at a total of 0.15 mg/day," Ames writes. "Exaggerating the risks from manmade substances, ignoring the natural world, and converting the issue to one of blaming U.S. industry does not advance our public health efforts. If we spend all our efforts on minimal, rather than important, hazards, we hurt public health."[37]

Other researchers defend such laboratory studies, arguing that certain pesticides may pose real cancer-causing hazards to people, even in small amounts.[38] Despite such disputes, the long-term health effects are largely unknown for many pesticides.[39] But most researchers would agree that people who are exposed to large amounts of pesticides generally are the most susceptible to harm.

"[We] are more concerned about the farmers, occupationally exposed workers, pesticide applicators, weekend gardeners, and others who may be repeatedly exposed to much higher levels of pesticides and therefore are at greater risk," say researchers James Huff and Joseph Haseman of the National Institute of Environmental Health Sciences.[40]

Even studies of occupational groups that are exposed to higher levels of pesticides have raised

more questions than they have answered. For instance, a detailed review of epidemiological studies by researchers at the National Cancer Institute found that farmers were at lower risk for most major causes of death—including most types of cancer—than the general population.[41] However, the review found that farmers had moderately elevated levels for several types of cancer, including leukemia, Hodgkin's disease, multiple myeloma, and cancers of the lip, stomach, skin, prostate, brain, testes, and connective tissue.

Such concerns have led some researchers to compare pesticides to medicinal drugs. That is, both classes of chemicals have far-reaching benefits that must be weighed against their potential for causing serious harm. "The tremendous diagnostic and therapeutic value of drugs justifies their use, but in turn requires a detailed study of their side effects," writes Wayland Hayes, a physician and toxicologist at Vanderbilt University. "The same is true for pesticides. Their important contributions to our health and economy guarantee their continued use as a class and require the most complete knowledge of toxicology that we can achieve in order to avoid hazards."[42]

An Overview of Federal Pesticide Regulation

The dual nature of pesticides—that is, their potential to yield great benefits as well as cause serious damage—is the basic concept guiding modern pesticide regulation. Although the federal government has regulated pesticides since 1910, most early legislation was aimed at consumer protection and product performance.[43] Current regulation seeks to allow the beneficial uses of pesticides while minimizing their hazards to public health and the environment.[44]

The primary agency charged with implementing federal pesticide regulation is the U.S. Environmental Protection Agency (EPA). Previously, pesticides were regulated through the U.S. Department of Agriculture and the Food and Drug Administration, but Congress transferred most authority to the EPA when it created the agency in 1970. In practice, the EPA has delegated many pesticide enforcement responsibilities to the states. However, the EPA remains the final authority and can preempt states that fail to take proper enforcement actions.[45]

The primary law guiding pesticide use is the **Federal Insecticide, Fungicide, and Rodenticide Act**, or FIFRA. Originally enacted by Congress in 1947, FIFRA required pesticide manufacturers to *register* their products with the Department of Agriculture. It also required manufacturers to label their products with directions aimed at ensuring safe use.

In 1972, Congress amended FIFRA while enacting the nation's most comprehensive pesticide legislation, sometimes known as the Federal Environmental Pesticide Control Act. One of the law's central tenets is that the EPA must consider both the costs and benefits of pesticides in regulating their use.[46] "Unlike most other environmental statutes, which focus on pollution abatement, FIFRA, as amended, focuses on balancing the inherent risks and benefits of substances that are generally designed to be injurious to living organisms and deliberately introduced into the environment," according to a review of pesticide regulation by the General Accounting Office. "This balancing of risks and benefits underlies all basic regulatory decisions under the act."[47]

The FIFRA amendments of 1972 included key provisions that: made it illegal to use pesticides in ways "inconsistent" with the directions on product labels; authorized fines and penalties for dealers or applicators who violated pesticide regulations; and required that all pesticide products be registered with the EPA. Before registration, the law required that manufacturers provide scientific evidence that pesticide products—when used as directed on labels—would: (1) effectively control the targeted pests; (2) not harm humans, crops, livestock, wildlife, or the total environment; and (3) not leave illegal residues on food or feed products.

The FIFRA amendments also directed the EPA to classify all pesticides into two categories: *restricted use*, which generally includes the most hazardous products, such as the highly toxic herbicide paraquat; and *general use*, which includes less toxic chemicals, such as the herbicide Roundup (glyphosate) and other chemicals sold in garden shops.[48] The law required states to certify—that is, to train and test—anyone applying restricted-use pesticides. Most states *train* applicators through their cooperative extension services, with *certification* handled by their departments of agriculture.

Congress has amended FIFRA a number of times since 1972, with the most substantive changes dealing with product registrations. Tougher registration requirements have led the EPA to cancel more than 26,000 pesticide

—continues on page 14

Pesticide Taints Neighborhood's Drinking Water

FUQUAY-VARINA—Residents of the Pear Meadows subdivision were accustomed to occasional odors and discoloration in their drinking water. They figured that went along with living in the country and getting their water from a well. Then came a rude awakening.

"The first week in February, we came home and found notes attached to our doors," recalls Tammi Fitzgerald, a resident of the neighborhood in southern Wake County. "We were told not to drink our water."

The letter from the state health officials informed residents that a hazardous pesticide had been detected in their water. It warned them not to drink or cook with their water and to limit their bathing to less than five minutes. The news didn't sit well with residents.

"We were shocked," says Keith Elder, one of 38 homeowners in the subdivision near Fuquay-Varina. "There were some people who thought they were being poisoned."

The chemical contaminating the water is called ethylene dibromide, or EDB, a suspected cause of cancer. Tests of the neighborhood's well have detected EDB in concentrations of 1 part per billion—or 20 times the level determined as safe for drinking water by the U.S. Environmental Protection Agency.

—continues

Tammi Fitzgerald and other residents of the Pear Meadows subdivision have relied on bottled water since tests detected a toxic pesticide in their well.

Roger Winstead, The News & Observer

Drinking Water

—continued from page 11

"In animal studies, [EDB] has been shown to be an extremely potent carcinogen," says Dr. Ken Rudo, a toxicologist with the state Division of Epidemiology. "In human studies, there has been nothing definitive established. So, it's classified as a probable human carcinogen."

Despite the warnings, Rudo says the levels of EDB found in the neighborhood's water are not acutely poisonous. Instead, the chemical is considered a chronic hazard—that is, one that could cause health problems if residents continue to drink and use the water for long periods of time. But that distinction has done little to allay people's concerns.

"The pesticide problem is something they [agricultural interests] want to ignore—and now it's our problem. Their negligence is our burden."

—KEITH ELDER OF FUQUAY-VARINA
RESIDENT OF NEIGHBORHOOD WITH
CONTAMINATED WELL

"A lot of residents refuse to use the water at all," Elder says. "We run our clothes uptown to wash them. People's everyday routines come to a halt when something like this comes up." Mrs. Fitzgerald has been bathing her daughter with cold water and a sponge, so she won't breathe fumes from the evaporating chemical. "A lot of people might feel like that's being overly protective," she says. "But when you're talking about your own children, what do you do?"

The water problem also has put a damper on real-estate transactions, leaving several homes unoccupied or unfinished. "People who want to sell, can't," Elder says. "People who want to move in, can't. People who want to lock in on new loans, can't—not until the water problems are worked out."

Meanwhile, residents are drinking bottled water. They have hired a lawyer who is negotiating with the town of Fuquay-Varina and Harnett County—both of which have water lines within one-half mile. Residents hope one of the local governments will agree to extend water service to Pear Meadows. They also are trying to find out who is responsible for the contamination.

EDB generally seeps into the groundwater from two sources: pesticide applications and leaking underground gasoline storage tanks. Although the Environmental Protection Agency banned EDB for most pesticide uses in 1983, previously it was widely used as an insecticide and soil fumigant. It also is commonly used as gasoline additive. Rudo, the state toxicologist, says the contamination at Pear Meadows probably resulted from agricultural use or dumping. The land occupied by the neighborhood was once a farm, and investigators so far have identified no other potential contamination sources—such as leaking gasoline tanks.

"The whole area where they built the homes was nothing but a tobacco field," Rudo says. "There wasn't another [contamination] source anywhere. From time to time, we're going to find EDB contamination from pesticide use. But most of the time it's going to be associated with leaking petroleum tanks." (Also see the article, "Contaminated Wells, Odor Problems Sometimes Result from Exterminator Treatments," on pp. 16–18.)

Some environmentalists warn that the Pear Meadows incident is a harbinger for groundwater contamination problems that will result from routine pesticide use by farmers and other applicators across the state. "I think it's a real problem," says Erick Umstead, research director for the Agricultural Resources Center, an environmental group based in Carrboro. "There are a number of pesticides in routine use that are showing up in groundwater. The more we monitor, the more we are going to find."[1]

As evidence, Umstead cites a recent study that found pesticide contamination in 16 percent of the wells tested at 139 farms in Eastern North Carolina from 1989–1992.[2] The study by researchers at the University of North Carolina at Asheville was partially funded by Umstead's group. But state agriculture and environmental officials have harshly criticized the UNC-Asheville study, in part because the researchers have refused to identify the exact locations of all but one of the wells for follow-up tests.

State agriculture officials maintain that routine pesticide applications have rarely caused groundwater contamination in North Carolina. The issue should be resolved, they say, with the completion of a broader study by the state Department of Agriculture and the Department of Environment, Health, and Natural Resources.[3] The two agencies are establishing a statewide system for monitoring groundwater contamination from pesticides in North Carolina. That monitoring program eventually will test water from more than 150 wells in 65 counties, focusing on areas with vulnerable groundwater supplies and large amounts of agricultural production. Preliminary results have found detectable amounts of pesticides in about 6 percent of the 97 wells tested so far.[4] The study is supposed to be completed by April 1995.

The residents of Pear Meadows subdivision, however, don't get much consolation from the state's plans for monitoring and testing groundwater. "I just don't trust the government's ability to regulate these pesticides," Fitzgerald says. "If the world went back to organic gardening, rather than using these pesticides, I think we'd all be a lot better off."

Elder agrees. "The pesticide problem is something they [agricultural interests] want to ignore—and now it's our problem. Their negligence is our burden. I would say that 99 percent of the new subdivisions going up in this area are on current or former farmland. I just want to go up to those people's doors and say, 'Hey, get your water tested for pesticides.'"

—Tom Mather

FOOTNOTES

[1] As quoted by Stuart Leavenworth, "Subdivision's toxic water may indicate wider problem," *The News & Observer,* Raleigh, N.C., April 6, 1994, p. 1A.

[2] See Richard Maas, et al., "An Assessment of Pesticide Contamination of Eastern North Carolina Well Water," Environmental Quality Institute, University of North Carolina at Asheville, Technical Report No. 92-004, May 1992, 34 pp.

[3] For details on study methods and preliminary findings, see Henry Wade, *et al.*, "The Interagency Study of the Impact of Pesticide Use on Groundwater in North Carolina: Study Methods & Interim Status Report," N.C. Pesticide Board, March 31, 1993.

[4] Personal communication from Henry Wade, project coordinator of the Interagency Study of the Impact of Pesticide Use on Groundwater in North Carolina, N.C. Department of Agriculture, June 1994.

O, they tell us there's poison in the well, that someone's been a bit untidy and there's been a small spill. Not a lot, no, just a drop. But there you are mistaken, you know you are. I wonder just how long they knew our well was poisoned but they let us just drink on.

—Natalie Merchant
of 10,000 Maniacs
"Poison in the Well"

A good part of agriculture is to learn how to adapt one's work to nature. . . . To live in right relation with his natural conditions is one of the first lessons that a wise farmer or any other wise man learns.

—Liberty Hyde Bailey
Former Professor of Horticulture
at Cornell University
[As quoted by Wendell Berry
in *What Are People For?*]

—continued from page 10

products since 1988.[49] Despite those cancellations, the EPA allows the use of a number of pesticides that have not been fully tested for health and environmental effects.[50]

Another key law dealing with pesticide regulation is the **Federal Food, Drug, and Cosmetic Act** of 1954. The law authorized the Food and Drug Administration to condemn any agricultural products that contain non-approved pesticides or pesticide residues that exceed established tolerance levels. In 1958, Congress adopted an amendment that included the so-called Delaney Clause, which has become one of the most controversial laws dealing with pesticides. In essence, the Delaney Clause states that processed foods may not contain any chemical found to cause cancer in humans or animals through laboratory tests.[51] That requirement has become increasingly troublesome for food processors because of research studies linking greater numbers of chemicals to cancer and the ability of modern analytical techniques to detect minute amounts of such chemicals.

The EPA is responsible for setting pesticide tolerance levels, but the Food and Drug Administration is charged with enforcing the limits. "Tolerances are the single most important tool by which the U.S. Government regulates pesticide residues in food," according to the National Research Council.[52] The Federal Food, Drug, and Cosmetic Act defines a tolerance as the maximum quantity of a pesticide residue allowable on a raw agricultural product or in a processed food.[53]

Increasing recognition of the special risks posed to workers handling pesticides has prompted federal agencies in recent years to issue new regulations dealing with worker safety. In 1988, the Occupational Safety and Health Administration broadened its **Hazard Communication Standard**[54] to require all employers—including farmers—to provide workers with information on the dangers and safety precautions relating to hazardous chemicals used in the workplace.

In 1992, the EPA issued its **Worker Protection Standard**[55] for ensuring the safety of the

Tom Mather

Reginald Askew, a farmer from Eure, searches cotton plants for eggs of the boll worm, one of the most serious agricultural pests in North Carolina.

estimated 3.9 million agricultural workers and others who are exposed to pesticides through their jobs. The regulation, which took effect in part in April 1994, applies to pesticide handlers as well as workers in treated fields, greenhouses, forests, and nurseries.[56] Under the rule, employers must: provide workers with basic pesticide safety training; notify workers when applying pesticides; restrict entry to fields for minimum time periods following pesticide applications, depending on the toxicity of the chemicals used; and post signs summarizing basic information about pesticide safety. (See the article, "Farmworkers Seek Training About Pesticide Safety," on pp. 29–31, for more discussion of worker safety issues.)

Other federal laws with important provisions dealing with pesticides include:

- **The Endangered Species Act** of 1973 requires all federal agencies to insure that their actions—including pesticide use—will not jeopardize endangered or threatened plants and animals. Unlike FIFRA, the act does not require the EPA to weigh the costs and benefits of pesticide products in prohibiting uses that could harm endangered species.
- **The Transportation Safety Act** of 1974 authorized the U.S. Department of Transportation to regulate the shipping of hazardous materials, which include many pesticides.
- **The Right-To-Know Act**[57] of 1986 applies to all facilities that manufacture, use, or store more than 300 types of hazardous chemicals, including many pesticides.[58] The law requires owners to prepare plans for dealing with fires and other emergencies. It also requires them to report the presence of hazardous chemicals to appropriate local, state, and federal authorities.
- The **Food, Conservation, and Trade Act**,[59] more commonly known as the 1990 Farm Bill, requires pesticide dealers and applicators to keep records on the sale or use of all restricted-use products. The law does not require users to report that information to the state or federal government unless requested by regulators or inspectors. The U.S. Department of Agriculture is charged with implementing the regulations, which took effect May 1993.[60] (See the article, "Searching for Hens' Teeth: Information Scarce on Pesticide Usage," on pp. 20–29, for further discussion of federal record-keeping requirements for pesticide applicators.)

FOOTNOTES

[1] Rachel Carson, *Silent Spring*, Houghton Mifflin Co.: Boston, 1962.

[2] For a thorough discussion of the uses, history, and benefits and hazards of pesticides, see George W. Ware, *The Pesticide Book*, Thomson Publications: Fresno, Calif., 1994.

[3] *Ibid.*, pp. 4–5. The number of pesticide products has declined from about 50,000 in the mid-1980s, largely due to EPA cancellations of product registrations since 1989.

[4] *North Carolina Pesticide Report*, N.C. Department of Agriculture, 1992, p. 331.

[5] Arnold Aspelin, et al., *Pesticide Industry Sales and Usage: 1990 and 1991 Market Estimates*, U.S. Environmental Protection Agency, Office of Pesticide Programs, Washington D.C., 1992, Publ. No. H-7503W, pp. 7–11.

[6] *Ibid.* According to the EPA, agriculture accounted for 75.9 percent of the total pesticide usage by weight and 73.6 per cent of the total expenditures on pesticides in the United States in 1991.

[7] See Ware, note 2 above, p. 8., and David Pimentel, *et al.*, "Environmental and Economic Costs of Pesticide Use," *BioScience*, Vol. 42, No. 10 (November 1992), p. 750.

[8] Ware, note 2 above, pp. 5–8.

[9] *Ibid.*

[10] See David Pimentel, *et al.*, "Environmental and Economic Effects of Reducing Pesticide Use," *BioScience*, Vol. 41, No. 6 (June 1991), p. 402.

[11] Ware, note 2 above, p. 8. David Pimentel, an entomology professor at Cornell University, disputes Ware's contention that 10–12 percent of the U.S. population would have to work on farms to replace the benefits of herbicides. "I seriously doubt that it would be 3 percent, which is a 50 percent increase over current labor input on U.S. farms," Pimentel says.

[12] See Ware, note 2 above, pp. 10–19; also, Wayland J. Hayes Jr. and Edward R. Laws Jr., *Handbook of Pesticide Toxicology*, Vol. 1, Academic Press: San Diego, Calif., 1991.

[13] *Ibid.*, Hayes and Laws, p. 9.

—continues on page 18

It is a myth that 'manmade' or synthetic compounds are dangerous and toxic, whereas the same compounds found in nature —for example, 'natural chemicals'—are safe. There is no chemical difference between them.

—Dixy Lee Ray, Former Governor of Washington
from *Trashing the Planet*

Contaminated Wells, Odor Problems Sometimes Result from Exterminator Treatments

RICHFIELD—Tommy and Robin Rogers weren't surprised when they smelled a strong chemical odor around their home after a trip to the beach last spring. After all, an exterminator had treated their house for termites the week before. They were surprised, however, when they drank some water from their faucets.

"We could smell it in the water almost immediately," says Tommy Rogers, who lives about five miles outside the town of Richfield in Stanly County. It was a sweet, sickly smell. I thought, 'Surely, it's not in our water.'"

The next day, they called the county health department, which took water samples from the well. But the Rogers family kept on using their water—until they heard from a state investigator one month later. "He said, 'Do not drink any of that water," says Robin Rogers, Tommy's wife. "He scared me to death."

Tests had detected unsafe levels of a pesticide in their well water. The pesticide was a product called Dursban (chlorpyrifos), the same chemical the exterminator used to treat their home. As a result, the state Division of Environmental Management sent a notice of violation to the exterminator, Paul Clinton Miller Jr. of Love Bug Exterminating Co. in Mount Pleasant. Miller says he did everything by the book when treating the Rogers' home.

> ***"Our well, as far as I know, is now clean. But I am curious as to how it happened and why. And I wonder if it could happen again with something else."***
>
> —TOMMY ROGERS OF RICHFIELD, HOMEOWNER WITH WELL CONTAMINATED BY PESTICIDE

"What bothers me the most is it's still unclear to me how it happened," Miller says. "Our closest application was about 52 feet from the well." Rogers, as well, doesn't blame the exterminator for the problems. He says the problem probably was caused by the construction of his well, which is 305 feet deep but is cased only for the top 42 feet. A cased well is lined and sealed to prevent contaminants from entering it. "I was here when he did the application," Rogers says. "He was very thorough. As far as I can tell, everything was done according to the regulations."

State records show that exterminators have the second-highest violation rate among the various types of pesticide applicators. (For a detailed discussion of violations by applicator types, see the article, "Enforcement of Pesticide Regulations in North Carolina," on pp. 32–60.) But officials with the N.C. Department of Agriculture, which regulates exterminators, say that such well contamination incidents are unusual. Preliminary results from a statewide groundwater monitoring program have detected pesticide contamination in about 6 percent of 97 wells tested so far. (For more details, see the article, "Pesticide Taints Neighborhood's Drinking Water," on pp. 11–13.)

The most common problem with structural pest control applications, agriculture officials say, is extermina-

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Myron Dowell

Tommy Rogers and his daughter stand next to his well, which was contaminated by a pesticide used to treat his home for termites.

tors who don't apply enough pesticides to kill termites and other insects that can destroy homes. But officials in the state Department of Environment, Health, and Natural Resources have a different perspective. They have investigated a number of cases where structural pest applications have caused serious problems—ranging from noxious fumes to contaminated wells. At a minimum, such problems can inconvenience homeowners, temporarily forcing them to leave their homes or stop drinking their water. In more serious cases, exposures to toxic pest control chemicals can pose potential health hazards, such as breathing problems and nerve damage.

In one case, Kevin Long of Garner says an exterminator mistakenly drilled through the foundation of his home, soaking the basement walls with pesticide. The fumes were so bad that his family had to move out of the house for a week. "It was pretty rough," he says. "We got open sores in our mouths and on our faces and lips." But the family apparently has suffered no lasting health problems, Long says, and the company replaced all of the wallboard in his basement.

State health officials say the most common problem they encounter with exterminators is the contamination of private wells by pesticides used to control termites and other structural pests. "This is an underestimated problem," says Dr. Ken Rudo, a toxicologist with the state Division of Epidemiology. "I've seen this happen a couple of dozen times over the past few years. And these are just the cases we know about. There could be hundreds of other cases we never hear about."

Many of those wells are tainted by chlordane, Rudo says, even though the U.S. Environmental Protection Agency has banned the chemical since 1988. "We see chlordane at low concentrations in wells all the time," he says. "In the old days, that was the chemical of choice for most exterminators." Dursban, the chemical most often used by exterminators as a replacement for chlordane, also has begun showing up in wells, Rudo says. Such contamination, he says, can show up soon after exterminators treat homes for termites

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Contaminated

—continued from previous page

or other pests.

"I've seen it happen in a day," Rudo says. "We saw one woman whose well water literally turned white from the Dursban. It was present in a concentration of about 25 parts per million. You could taste it. The smell was very noticeable."

Tommy and Robin Rogers were relatively lucky. They noticed their contamination soon after it occurred, and the levels of Dursban in their well were not dangerously high. The exterminator also offered to supply the family with bottled water after the contamination was detected, Rogers says. Plus, he treated their well by pumping it out and adding chlorine—which is supposed to neutralize the pesticide—at no cost. Subsequent tests have detected no more of the pesticide.

"Our well, as far as I know, is now clean," Rogers says. "But I am curious as to how it happened and why. And I wonder if it could happen again with something else." The experience also has left Rogers more wary. "I think awareness is the key to it," he says. "Anytime I have something sprayed, especially to the foundation or the soil, I would get the water tested. If it hadn't been for the smell, we'd still be drinking it."

Miller, the exterminator, says it was fortunate that he treated the Rogers' house with Dursban because it can be sensed at minute concentrations—an attribute not shared by other termiticides. "Dursban has such a strong odor that you can smell it or taste it down to 10 parts per billion," he says. "These other products do not have any odor or taste. That's what scares me."

—Tom Mather

"This [well contamination] is an underestimated problem. I've seen this happen a couple of dozen times over the past few years. And these are just the cases we know about. There could be hundreds of other cases we never hear about."

—Dr. Ken Rudo, Toxicologist
N.C. Division of Epidemiology

—continued from page 15

[14] *Ibid.*; also see Ware, note 2 above, pp. 17–19; and National Research Council, *Pesticides in the Diets of Infants and Children*, National Academy Press: Washington, D.C., 1993, pp. 1 & 13.

[15] Ware, note 2 above, p. 19.

[16] See Pimentel, note 10 above, p. 403.

[17] *Ibid.*

[18] Carson, note 1 above, pp. 7–8.

[19] U.S. Environmental Protection Agency, "Unfinished Business: A Comparative Assessment of Environmental Problems," Office of Policy Analysis, February 1987, pp. 84–86.

[20] See Pimentel, note 7 above, p. 759.

[21] See Eugene P. Odum, *Fundamentals of Ecology*, W.B. Saunders Co.: Philadelphia, Pa., 1971, pp. 74–75.

[22] See Jim Dean, "Un-Endangered Wildlife," *Wildlife in North Carolina*, Vol. 55, No. 3 (March 1991), p. 36.

[23] For an alternative view on DDT and its effects, see Dixy Lee Ray and Lou Guzzo, *Trashing the Planet*, Regnery Gateway: Washington, D.C., 1990, pp. 68–77.

[24] According to the National Research Council, note 14 above, p. 228, wells provide drinking water to 53 percent of the total U.S. population and 97 percent of the rural population. Those percentages are essentially the same for North Carolina, according to the state Division of Environmental Health.

[25] See Elizabeth G. Nielson and Linda K. Lee, "The Magnitude and Costs of Groundwater Contamination from Agricultural Chemicals," U.S. Department of Agriculture, Economic Research Service, Report No. 576, October 1987.

[26] U.S. Environmental Protection Agency, *National Survey of Pesticides in Drinking Water Wells, Phase I Report*, Office of Pesticides and Toxic Substances, EPA 570/9-90-015, November 1990, Executive Summary, pp. vii–xv.

[27] As quoted by Stuart Leavenworth, "Study says some drinking water wells contaminated," *The News & Observer* (Raleigh, N.C.), Jan. 8, 1993, p. 1B.

[28] The Interagency Study of the Impact of Pesticide Use on Groundwater in North Carolina is being conducted jointly by the state Department of Agriculture and the Department of

Environment, Health, and Natural Resources.

[29] Personal communication with Henry Wade, project coordinator for the Interagency Study of the Impact of Pesticide Use on Groundwater in North Carolina, N.C. Department of Agriculture, June 1994.

[30] Ware, note 2 above, pp. 209–214.

[31] *Ibid.*

[32] *Ibid.*, pp. 210–211. Also see William M. Simpson Jr., "Health Effects as a Result of Exposure to Pesticides," presentation at the conference, "Pesticides and Health in the Southeast," School of Public Health, University of North Carolina at Chapel Hill, June 15, 1992.

[33] See National Research Council, note 14 above, p. 13. For detailed information on health effects, see Hayes and Laws, note 12 above (entire publication).

[34] U.S. Environmental Protection Agency, note 19 above, p. 28.

[35] *Ibid.*

[36] See Dan Fagin, "Breast cancer debate," *The News & Observer* (Raleigh, N.C.), Sept. 12, 1993, p. 17A. Also see Devra Lee Davis, *et al.*, "Medical Hypothesis: Xenoestrogens As Preventable Causes of Breast Cancer," *Environmental Health Perspectives*, Vol. 101 (October 1993), pp. 372–377.

[37] See Bruce Ames, "Too Much Fuss About Pesticides," *Consumers' Research*, April 1990, pp. 32–34. Ames uses the term "natural pesticides" in reference to natural substances in plants that repel or kill insects or other pests. For a rebuttal of Ames' arguments, see Thomas Culliney, *et al.*, "Pesticides and Natural Toxicants in Foods," *Agriculture, Ecosystems and Environment*, 41 (1992), pp. 297–320, Elsevier Science Publishers B.V., Amsterdam.

[38] See "The Perils of Pesticides," *The Wilson Quarterly*, Spring 1991, pp. 132–133.

[39] See U.S. General Accounting Office, "Pesticides: EPA's Formidable Task to Assess and Regulate Their Risks," Publ. No. GAO/RCED-86-125, Washington, D.C., April 1986, 138 pp.

[40] As quoted in *The Wilson Quarterly*, note 38 above, p. 133.

[41] See Aaron Blair and Shelia H. Zahm, "Cancer Among Farmers," *Occupational Medicine: State of the Art Reviews*, Vol. 6, No. 3 (July–Sept. 1991), Hanley & Belfus Inc.: Philadelphia, Penn., pp. 335–354.

[42] Hayes and Laws, note 12 above, p. 9.

[43] U.S. General Accounting Office, 1986, note 39 above, p. 11.

[44] National Research Council, note 14 above, p. 17.

[45] Ware, note 2 above, pp. 240–243.

[46] U.S. General Accounting Office, note 39 above, pp. 11–12. FIFRA, as originally enacted by Congress in 1947, required the U.S. Department of Agriculture to register pesticides in order to protect users from ineffective and acutely dangerous products. Congress transferred the authority for administering FIFRA to the newly established EPA in 1970. In response to growing concerns over the potential health and environmental hazards associated with pesticides, Congress substantially amended FIFRA in 1972 (7 U.S.C. 136 *et seq.*). The 1972 version and changes enacted in 1975, 1978, and 1980, broadened FIFRA's regulatory scope, changing the law's emphasis from primarily consumer protection and product performance to public health and environmental protection.

[47] *Ibid.*

[48] For a legal definition of general and restricted-use pesticides, see 7 U.S.C. 136. Although the law defines restricted-use pesticides as potentially more hazardous, some environmentalists contend that many general-use products are equally dangerous.

[49] Ware, note 2 above, p. 246.

[50] U.S. General Accounting Office, note 39 above, pp. 12–13. Also see Shirley A. Briggs, *Basic Guide to Pesticides*, Hemisphere Publishing Co.: Washington, D.C., 1992, pp. 280–282.

[51] For more on the Delaney Clause, see the National Research Council, *Regulating Pesticides in Food: The Delaney Paradox,* National Academy Press, Washington, D.C., 1987, 288 pp.

[52] National Research Council, note 14 above, p. 18.

[53] *Ibid.*, p. 8.

[54] 29 Code of Federal Regulations 1910.1200

[55] 40 Code of Federal Regulations 170.

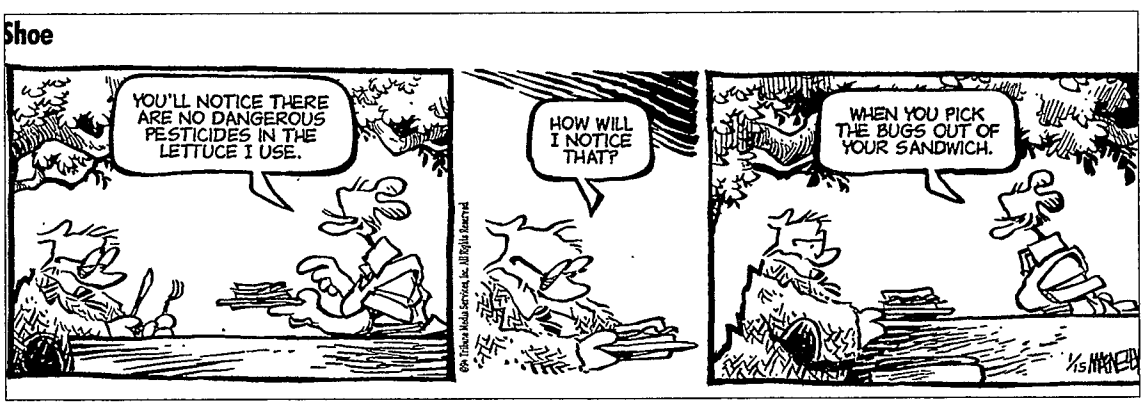
[56] In early 1994, Congress delayed implementation for most of the requirements in its Worker Protection Standard until Jan. 1, 1995.

[57] The full name of the law is: The Emergency Planning and Community Right-To-Know Act, or Title III of the Superfund Amendments and Reauthorization Act of 1986.

[58] The Right-To-Know law does not apply to the "inert" ingredients of pesticide products, which include a range of solvents and other chemicals used as carriers, binders, and fillers.

[59] 7 U.S. Code 136i-1.

[60] 7 Code of Federal Regulations 110.19014.



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II

Searching for Hens' Teeth: Information Scarce on Pesticide Usage

by Tom Mather

Despite the potential hazards of pesticides, the federal government and most states do not compile comprehensive information on the amounts applied by users. Detailed data on pesticide usage are estimates at best, particularly at the state level. However, such data could be compiled from records farmers are required to keep under the federal 1990 Farm Bill. Although collecting and evaluating the data could pose problems, the state has an existing agricultural statistics program that could tackle the effort with additional resources.

Agricultural authorities can tell you how many acres of corn farmers grow in the United States each year, how much it is worth, and the yield per acre. They can cite similar statistics for wheat, soybeans, cotton, tobacco—or virtually any crop. And they can break down that information by county, state, or the nation, dating back dozens of years. But there's one key question that agricultural authorities can't answer: How much pesticides are farmers using?

Despite their broad use and potential hazards, there is a general lack of specific information on the amounts and kinds of pesticides applied across the United States. The federal government does not collect or compile detailed records on pesticide usage, and neither do most states—including North Carolina.

"It's a big blur out there," says Dave Moreau, director of the University of North Carolina's Water Resources Research Institute. "Most people can't even pronounce the names of a lot of these chemicals."

Congress took a step toward stronger requirements when it passed the 1990 Farm Bill. The law directed the U.S. Department of Agriculture to develop a record-keeping system for pesticide applicators. Those requirements, effective May 1993, require applicators to keep records on their use of all restricted-use products[1]—which generally include the most toxic pesticides. Required information includes: the product name and registration number; the total amount applied; the location and size of area treated; the type of crop or commodity treated; the date of application; and the name and certification number of the person who applied the pesticide.

Pesticide users must maintain those records for two years following applications, and they can be fined if they don't.[2] They must supply their records—if requested—to regulators, inspectors, or licensed health-care professionals. But the law

currently does not require users to systematically report that information to the states or the federal government, although the U.S. Department of Agriculture plans to consult the records in conducting future surveys of pesticide use.

EPA Surveys Provide Broad Estimates of Pesticide Usage

Currently, the best-available information on pesticide use is produced by the U.S. Environmental Protection Agency. The EPA has published regular *estimates* of pesticide production and use for the nation based on surveys of selected manufacturers and applicators for a number of years.

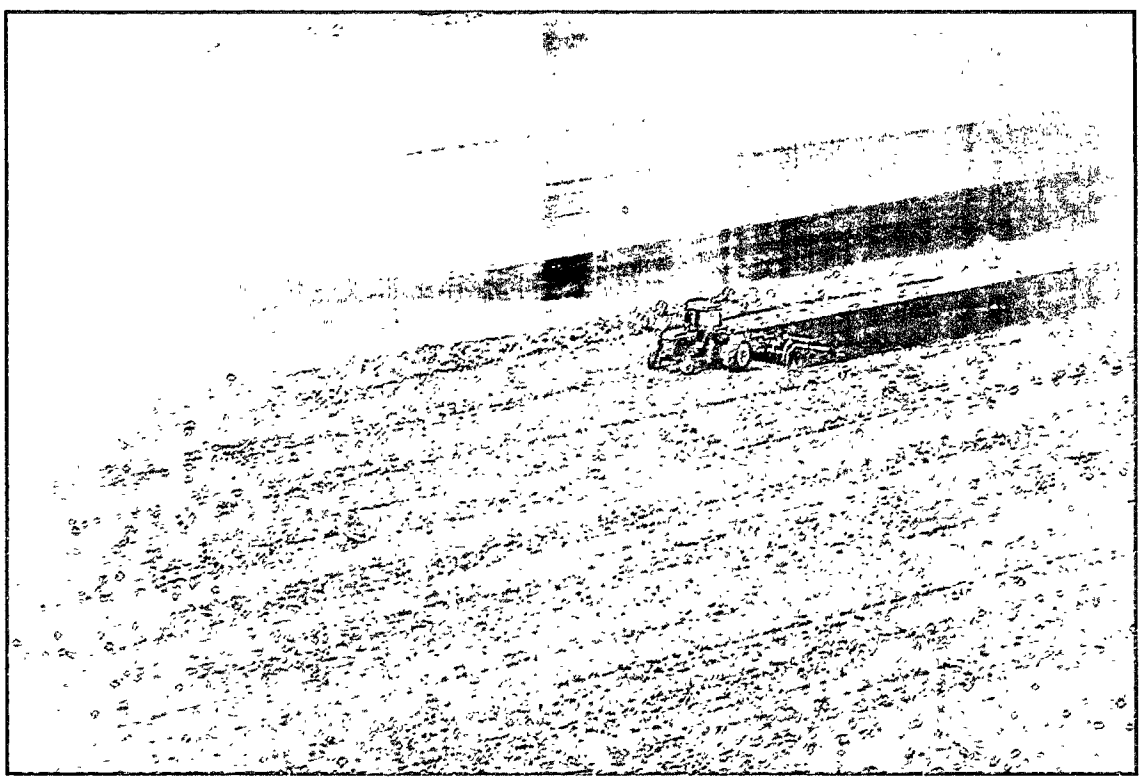
In 1991, United States manufacturers produced nearly 1.1 billion pounds of conventional pesticides valued at $8.26 billion, according to EPA estimates. Total pesticide usage for agriculture and other purposes averaged about 4.3 pounds per person in the United States in 1991.[3] Overall pesticide usage has remained fairly constant, ranging from 1.0 to 1.2 billion pounds a year since the mid-1970s after rising sharply in the 1950s and 1960s.

Agriculture consumes the lion's share of pesticides, accounting for about three-fourths (76 percent) of the total pesticide usage by volume in 1991, according to the EPA. (See Figure 2 on p. 22.) Industry, business, and government represented another 18 percent of the total pesticide use, while home and garden use accounted for the remaining 6 percent.[4] Despite the relatively small amounts used in homes and gardens, a recent EPA survey found that 85 percent of the 2,000 households it sampled in 29 states had at least one pesticide product stored on their premises.[5]

Herbicides are the most frequently used class of pesticides, accounting for 58 percent of the total estimated use in 1991. Insecticides made up 23 percent of the total use, fungicides 11 percent, and various other types of pesticides about 7 percent. (See Figure 1 on p. 5.) The use of insecticides and fungicides has declined since the 1960s, while herbicide use has increased dramatically.[6]

A few major crops account for most of the pesticides used on farms. Studies in the early 1980s found that 94 percent of the herbicides and 89 percent of the insecticides used in agriculture were applied to just four crops—corn, soybeans,

Agricultural pesticide use in North Carolina is highest in the Coastal Plain, where this tractor is shown plowing a field.



Ken Taylor, N.C. Wildlife Resources Commission

cotton, and small grains.[7] However, pesticide usage can be locally intense on some "minor" crops, such as tobacco and peanuts, even though the total acreage of those crops is relatively small on a national basis. That is particularly true for states like North Carolina with highly diversified agricultural economies—that is, with farmers growing smaller acreages of many different types of crops, rather than large acreages of just a few crops.[8] Pesticide use also varies by geography because insects and other pests generally are more prevalent in areas with humid and warm climates.

Pesticide Use Largely Untracked at the State Level

Although the federal government has just begun requiring detailed records on pesticide use, many states have more extensive requirements. In its nationwide survey of pesticide administrators, the N.C. Center for Public Policy Research found that 84 percent of the states say their record-keeping rules exceed federal requirements. (See Table 1 on p. 23. For a detailed discussion of the survey's methodology and other results, see the article "How North Carolina Stacks Up Against Other States in the Regulation of Pesticides" on pp. 61–95.)

The Center's survey found that three-fourths of the states (including North Carolina) require applicators to keep records on certain general-use pesticides as well as all restricted-use chemicals. Some states, such as New Hampshire, even publish their own lists of restricted-use pesticides. However, only about half the states require pesticide applicators to *report* their records back to the state or make those records available for public inspection. (North Carolina does neither.)

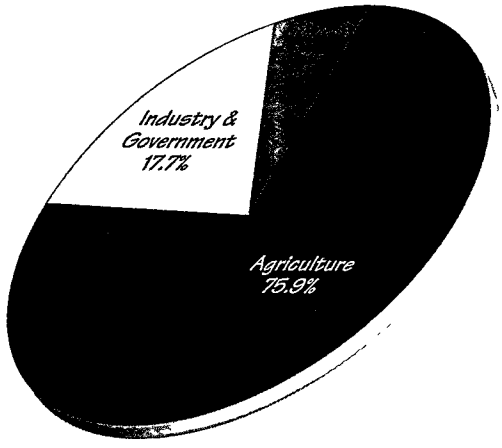
Less than one-third of the states have mandatory systems for reporting pesticide-related injuries, illnesses, or deaths. North Carolina does not require hospitals and medical centers to report pesticide-related health problems, although it requires records for other environment-related conditions, such as exposures to lead and other heavy metals. "That is something that is reasonable and ought to be done," says Dr. Greg Smith, a member of the state Pesticide Board and a physician with the state Department of Environment, Health, and Natural Resources. "It's not that hard to report, either."

Most states with reporting requirements have only recently begun their programs, and administrators say they haven't had time to analyze the data. "We've got that information on paper in our filing cabinets right now," says James Moran, chief of the New York Bureau of Pesticide Regulation. "We're having discussions right now on how we might use it." A handful of states, however, have collected pesticide-use reports for 10 years or more. For example, the New Jersey Pesticide Control Program has required reporting since the early 1970s, and the New Hampshire Division of Pesticide Control has collected data since 1965. California initiated limited reporting requirements around 1970 and recently expanded the scope. "Since 1990, we have required 100-percent use reporting—even for farmers," says John S. Sanders, chief of environmental monitoring for the California Department of Pesticide Regulation.

States with long-standing reporting requirements say they use the information gathered to monitor and deal with health and environmental problems, such as groundwater contamination. For example, the New Hampshire Division of Pesticide Control discovered from its records that some applicators were misusing the herbicide clomazone. "We could go to our database and find out how much was being used and where," says Division Director Murray L. McKay. "We

—continues on page 24

Figure 2.
Percentage of Pesticide Use in the United States by Applicator Groups, 1991



Source: U.S. Environmental Protection Agency

Table 1.
State Pesticide Record-Keeping and Reporting Requirements

Question (Number of states responding)[1]	**All States (Percent Yes)**	**North Carolina[2]**
Do you require record-keeping for pesticide users beyond the minimum federal requirements? (45)[3]	84%	Yes
What chemicals do your record-keeping requirements cover? (45)		
General use pesticides	76%	Yes
Restricted use pesticides	96%	Yes
Other[4]	18%	No
Must pesticide users *report* those records to the state? (45)	51%[5]	No
Are those records available for public inspection? (45)	56%[6]	No
Does your state have a *mandatory* system for reporting pesticide-related injuries, illnesses, or fatalities? (45)	29%	No

[1] Number of states that answered this question in the N.C. Center for Public Policy Research's survey of 50 states.

[2] Responses to survey questions from the N.C. Department of Agriculture.

[3] Applicators of restricted-use pesticides are required to keep certain records as specified by the U.S. Department of Agriculture in the Food, Agriculture, Conservation, and Trade Act (FACT) of 1990, 7 C.F.R. Part 110.

[4] Some states publish their own list of restricted-use pesticides, or only require records for certain application methods, such as aerial spraying or chemigation (application through irrigation systems).

[5] "Yes" respondents include 13 states that "sometimes" require applicators to report records to the state.

[6] "Yes" respondents include four states where pesticide applicator records are "sometimes" available for public inspection.

found that some of the users weren't following all of the restrictions on the label and were applying it too close to adjoining properties. So we had some contamination problems." In California, regulators used their records to track down applicators of methyl bromide after studies found that it could pose special health risks to people who fumigate buildings with the chemical. "These problems are being mitigated by us being able to see how much is being used and where," says Kathleen Harvey of the California Department of Pesticide Regulation. "And methyl bromide is just one example."

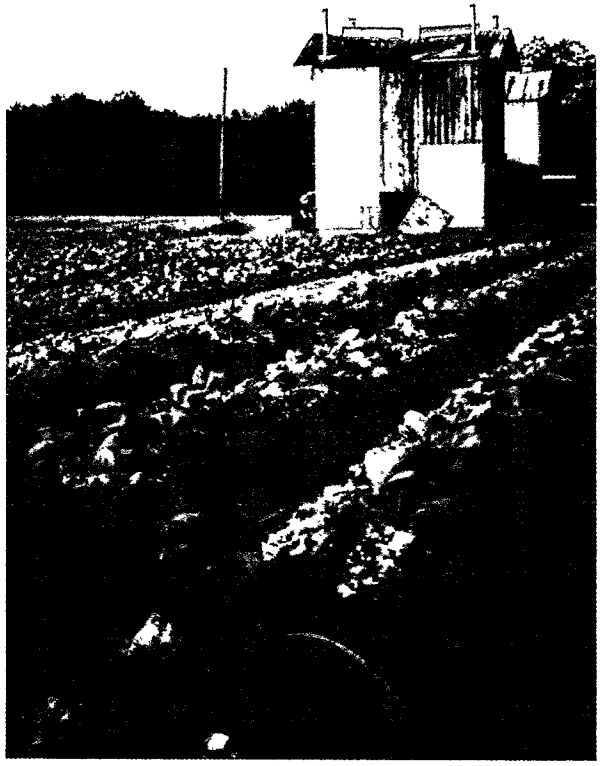
Pesticide Use Estimates: Best Guesses or Flawed Data?

The lack of hard numbers in most states, however, has led some researchers to develop ways to estimate pesticide usage. Resources for the Future, a research organization based in Washington, D.C., has estimated pesticide use in each state by relating readily available information on crop production to the amounts of various chemicals typically applied to major crops.[9] (Figure 3 on p. 25 shows the relative amount of pesticides used by state as estimated by Resources for the Future.) By that methodology—which excludes pesticides not applied for agricultural purposes—the group estimated that farmers used about 750 million pounds of pesticides a year in the late 1980s.

Resources for the Future estimated that North Carolina farmers used about 14.3 million pounds of pesticides per year, ranking 19th among the lower 48 states. On a per-area basis, North Carolina's usage amounted to 292.6 pounds per square mile a year, ranking 17th among the states. The UNC Water Resources Research Institute has applied a similar methodology in estimating pesticide usage in North Carolina by county. That study showed that pesticide application is heavily concentrated in Eastern North Carolina, particularly in the Northeastern Coastal Plain. (See Figure 4 on p. 26.)

Leonard Gianessi, who co-authored the Resources for the Future studies, acknowledges that his estimates may not be precisely accurate for individual states. But he says the studies are useful for comparing the relative amounts of pesticides used by states, since the same methodology was applied nationwide. "That's the way we encourage people to use the data," says Gianessi, who now works for the National Center for Food and Agricultural Policy, a nonprofit based in Washington, D.C.

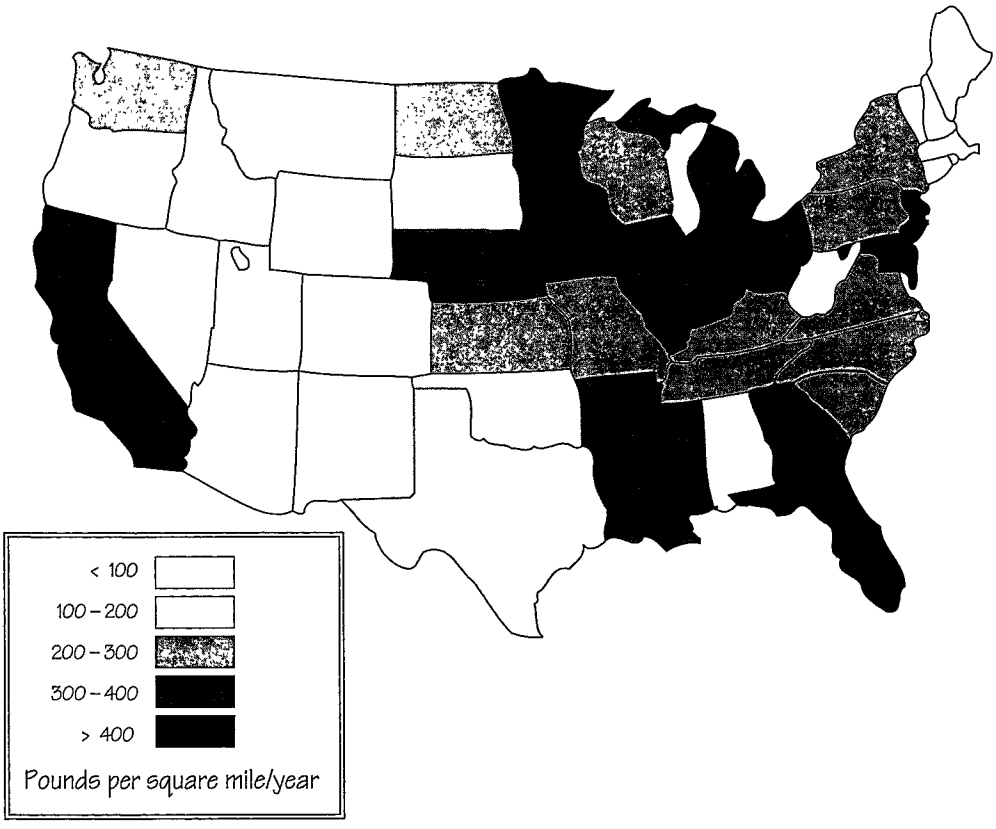
Some observers, however, harshly criticize the pesticide-use estimates derived by Resources for the Future. Allen Spalt, director of the Agricultural Resources Center, a nonprofit group based in Carrboro, says the RFF studies greatly underestimated pesticide use because they only considered agricultural usage and focused on major crops. Other studies of pesticide use in North Carolina, he says, have estimated annual application rates two to three times higher than the Resources for the Future estimates. For example, agricultural researchers at N.C. State University estimated in 1987 that North Carolina farmers used between 15.8 million to 49.8 million pounds of pesticides a year—just looking at the 10 most commonly used products.[10]



Tom Mather

Tobacco, although not a major crop nationally, accounts for much of the pesticide use for agriculture in North Carolina

Figure 3.
Estimated Pesticide Usage in the Continental United States, 1987–89



Source: Resources for the Future

"They may be the best numbers available, but they're not worth very much," Spalt says of the Resources for the Future studies. "I don't know whether his estimates mean anything for other states. But I do know they're completely wrong for North Carolina. That probably means that none of their numbers mean very much."

Other observers disagree, saying that such studies provide reasonable estimates of pesticide use—given the absence of reporting requirements for pesticide users. "There are pros and cons, but I tend to agree that [the Resources for the Future] database is the best available," says Steve Toth, an extension specialist in the NCSU Department of Entomology. "Generally, I would not discount his data. Many people say, 'If it's not perfect data, don't use it.' But if you do that, there's not much data you can use anywhere."

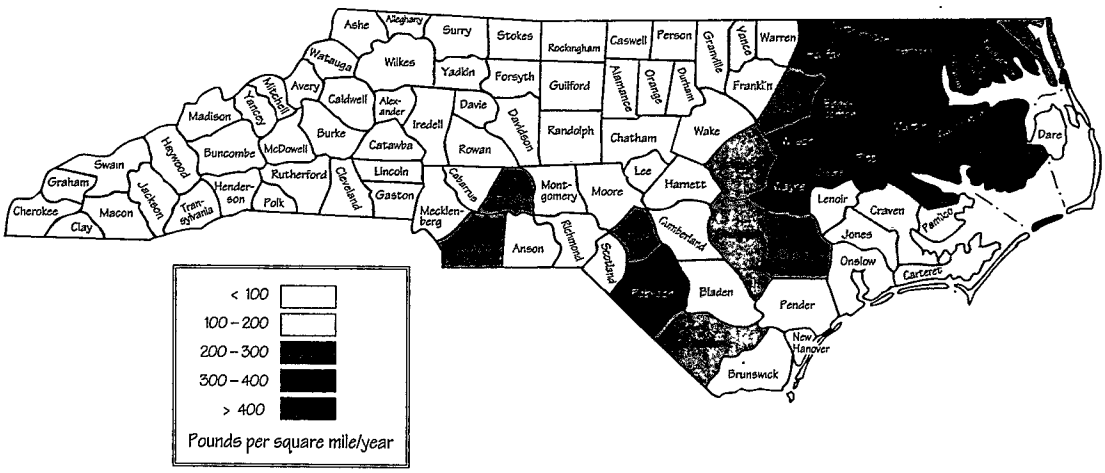
Pesticide Use Data Could Have Many Benefits

Many researchers and environmentalists say there could be valuable benefits from compiling more accurate and complete information on pesticide use. One of those who believes there is a critical need for better pesticide use data is Dave Moreau of the UNC Water Resources Research Institute.

"I just think we need to remove a lot of the mystery from all of this," says Moreau, who also chairs the N.C. Environmental Management Commission. "From an environmental standpoint, we clearly want to identify and study those chemicals that are widely used—and hazardous."

Accurate information could be useful for a number of reasons, including: determining where

Figure 4.
Estimated Pesticide Usage in North Carolina by County, 1987–89



Source: University of North Carolina Water Resources Research Institute. (Data not available for Lenoir and Alexander counties.)

to concentrate regulatory and training efforts; assisting regulators in the recall of canceled pesticide products; establishing programs for monitoring surface-water and groundwater contamination; preventing and cleaning up potential pollution problems; and detecting and treating potential health problems associated with pesticide use. Such records could benefit farmers as well, who could use the data to evaluate the effectiveness of various pesticides in controlling pests and improving crop production. Farmers also are among those most susceptible to potential pesticide-related hazards, including health problems and groundwater contamination. "Pesticides have good and bad aspects to them," says Toth, the NCSU extension specialist. "In the long run, I think it would help farmers to know how much pesticides are being used."

> ***"I just think we need to remove a lot of the mystery from all of this. From an environmental standpoint, we clearly want to identify and study those chemicals that are widely used —and hazardous."***
>
> —Dave Moreau
> Director of UNC Water Resources Research Institute, Chairman of N.C. Environmental Management Commission

Robert Fugitt, governmental affairs manager for DuPont chemical company in Wilmington, Del., says most states probably will need to start tracking pesticide usage in order to comply with the U.S. Environmental Protection Agency's requirements for monitoring groundwater contamination. "States are going to need to know what pesticides are used and where," Fugitt says. "They're going to have to get that information somewhere. And, in most states, that's going to mean use reporting."

But others question whether the information would be worth the cost and inconvenience of gathering and analyzing the data. "Our basic philosophy is that there's no need to regulate ourselves beyond what the federal regulators already do," says Alan York, a professor in the NCSU Department of Crop Science and chairman of the Pesticide Advisory

Council, which provides technical advice to the N.C. Pesticide Board. "The catch is: What are you going to do with these records once you get them? Somebody has got to categorize them and sort them and evaluate them."

Some of the states that already have adopted reporting requirements reinforce that concern. "We have collected three years worth of use records," says Gail Kaprielian of the Massachusetts Pesticide Bureau. "But we haven't analyzed the data yet. . . . The problem as we see it is getting the data entered [on computers]."

However, administrators in states that have required reports for many years say that analyzing the data is not that expensive or difficult once the records are computerized. "I think the first year is probably the worst—just getting used to it," says Carmen Valentin of the New Jersey Pesticide Control Program. "But now I don't really think it's that bad. We've got it down pat." New Jersey eases the burden of collecting and analyzing data by requiring different applicator groups to file reports only once every three years. The data are computerized and then studied for trends. "What we're trying to do is analyze groundwater contamination based on the survey results," Valentin says. "It may even result in more enforcement actions, because it can help you pinpoint problems." The state also uses its data to analyze pesticide use by crop, monitor environmental conditions, and identify problem pesticides for potential use restrictions.

"[C]ollecting use data from all over the state at this point would be of questionable value given the costs and other environmental issues."

—George Everett, Executive Director
Chemical Industry Council of N.C.

State Has Existing Agricultural Data Network

The task of gathering and evaluating pesticide data is not as daunting, however, as it might appear. After all, the federal government and the states have compiled detailed statistics on crop production for decades, based on representative samples of farms. In North Carolina, such data are produced by the Agricultural Statistics Division, a joint effort between the U.S. and N.C. departments of agriculture. The division's annual report presents statewide and county-level statistics on more than a dozen major crops and at least six different types of livestock.[11] The division also began publishing data on pesticide use in 1992, based on a sample of about 450 farmers—representing less than 1 percent of the state's 59,000 farms.

"We get a lot of requests for [the pesticide-use information], just with the limited data we have collected," says Bob Murphy, the state agricultural statistician. "If the requests correlate with a need, there's a lot of need for that data."

The data now collected by the Agricultural Statistics Division are useful for estimating what *types* of pesticides farmers are using on various crops, including corn, soybeans, cabbage, peppers, cucumbers, snap beans, strawberries, tomatoes, and watermelons. But those data are inadequate for determining the *amounts* of pesticides used statewide or by county, due to the sampling methods. However, Murphy says his division could readily compile more detailed pesticide-use data—if it had additional resources.

"We could do it here, as long as we had the funding to do it," he says. "It would be a big project, if it was required and put in place. But it could certainly be done."

The cost of compiling such data is hard to estimate, Murphy says, without knowing more details—such as whether to collect pesticide-use reports from all applicators or from a smaller sample pool. Environmental groups advocate the collection of pesticide-use reports from all or most applicators. "While a statistical sample would provide much valuable information, it would not serve all the purposes of gathering comprehensive pesticide use data," says Erick Umstead, research director for the Agricultural Resources Center. Umstead's group also advocates the collection of usage reports for *all* pesticides, not just restricted-use products. Some general-use pesticides are just as toxic as restricted-use chemicals, he says, plus restricted-use products accounted for only 3 percent of the 12,391 pesticides registered for use in North Carolina in 1992.

But compiling comprehensive usage reports

could be expensive, according to Gianessi, the researcher who produced the pesticide-use estimates for Resources for the Future. "For a state like Washington or North Carolina, you're talking about $1 million a year tabulating and making sense of this data," Gianessi says.

George Everett, executive director of the Chemical Industry Council of North Carolina, says such costs could overwhelm the potential benefits from collecting pesticide-use reports from all applicators. "If there are significant environmental or public health problems associated with pesticide use in North Carolina, I have not seen the data reported yet," says Everett, former director of the N.C. Division of Environmental Management. "If there is a significant impact on public health, it is likely to be on farmers, and efforts would be better targeted at them than at collecting use data. If there is an environmental impact on groundwater, the state-sponsored study is likely to identify it, and data on use in a problem area might be warranted. However, collecting use data from all over the state at this point would be of questionable value given the costs and other environmental issues."

But Moreau says that North Carolina could compile accurate pesticide-use data for much less money by taking a statistical sample of applicators—probably involving less than 1,000 people statewide. "It isn't going to take $1 million a year to do it," Moreau says. "I feel very confident that they could do it for less than $100,000 a year. They've got the names and addresses of these applicators. All they've got to do is draw a statistical sample and send a letter to those people. With a relatively small number of samples, properly drawn, we could track the major pesticides being used in this state."

The N.C. Pesticide Board apparently has the authority to require record-keeping and reporting for pesticide applicators. As the state Pesticide Law of 1971 states, the board can "collect, analyze and disseminate information necessary for the effective operation of the programs."[12] Currently, the board requires *record-keeping* for: certain sales of restricted-use pesticides by dealers; applications of restricted-use chemicals by licensed users; and use of *all* pesticide products by aerial applicators. But the Pesticide Board has shied away from adopting *reporting* requirements, and Pesticide Administrator John L. Smith fears such requirements could draw resources from existing enforcement programs.

"As a program administrator, I can see a need for the data," Smith says. "From a bureaucratic standpoint, it's nice to be able to collect the data and say we've got it. . . . I think we could make some decisions on a more knowledgeable basis, with respect to groundwater contamination and some of the other environmental concerns—or even crop concerns.

"From a policymaker's standpoint, I'm trying to look at the practicality of the system you put in place that yields the data. . . . The drawbacks are the accuracy of the data and the cost of collecting it on any kind of meaningful frequency. You're talking about a significant expansion in staffing and computer time to generate these kinds of reports."

Others, however, say the state could compile valuable data on pesticide usage at a reasonable cost by collecting reports from a sample of farmers and other applicators. "That's the way I would do it," says Toth, the NCSU researcher. "If you

"Pesticides have good and bad aspects to them. In the long run, I think it would help farmers to know how much pesticides are being used."

—Steve Toth, Extension Specialist
NCSU Department of Entomology

"Our basic philosophy is that there's no need to regulate ourselves beyond what the federal regulators already do. The catch is: What are you going to do with these records once you get them? Somebody has got to categorize them and sort them and evaluate them."

—Alan York, Professor
NCSU Department of Crop Science
Chairman of the Pesticide Advisory Council

Farmworkers Seek Training About Pesticide Safety

NEWTON GROVE—The sun has set when five farmworkers trudge back to their migrant labor camp in southern Johnston County. They've just toiled 14 hours in the fields planting sweet potatoes. They haven't had time to shower, eat dinner, or change out of their dusty work clothes. Yet they've gathered in a mobile home for a training class.

The class is about pesticide safety. It's being taught by the Farmworkers Project, a Benson-based nonprofit group. Project director Victoria Martinez says her group organizes such training sessions because few farmers teach their migrant workers about safe pesticide use—although a new federal law will require such training starting Jan. 1, 1995.

"The general rule is that they never receive any training on pesticides," Martinez says. "We try to educate farmworkers about the health hazards of pesticides and also make them aware of what the law requires."

Martinez and her assistant, Antonia Ventura, take about 45 minutes to deliver their presentation—all in Spanish. They use colorful posters depicting the symptoms of pesticide poisoning and showing workers how to avoid such problems. The five Mexican laborers pay close attention to the presentation, frequently interrupting with questions—while a pot of chili simmers on the stove. They're still asking questions when the session ends about 9:15 p.m.

Farmworker advocates say such training sessions are needed because farm laborers are among those most vulnerable to potential health problems related to pesticide exposure. Most farmworkers, they say, have first-hand experience with pesticide-related illnesses or know others who have gotten sick.

"Farmworkers every year suffer from pesticide poisoning," says Caroline Cardona, a health educator with Farmworkers Legal Services of North Carolina, a nonprofit group based in Newton Grove. "Every month and every day that people have to wait [for training], there will be more sicknesses and injuries."

Pesticide poisoning can be hard to identify because the symptoms vary and often mimic other sicknesses. Common symptoms

—continues

take a sample in a valid way, you would get just about as much information—and you wouldn't burden everybody. We need to have information on pesticide use. . . . More information will help the farmers as well as the general public."

FOOTNOTES

[1] 7 Code of Federal Regulations 110.19014.

[2] U.S. Department of Agriculture regulations specify that violators will be fined not more than $500 for initial violations and at least $1,000 for additional violations.

[3] Arnold Aspelin, *et al.*, *Pesticide Industry Sales and Usage: 1990 and 1991 Market Estimates*, U.S. Environmental Protection Agency, Office of Pesticide Programs, Washington D.C., 1992, Publ. No. H-7503W, pp. 1–11.

[4] *Ibid.*

[5] *Ibid.*, p. 3.

[6] See National Research Council, *Pesticides in the Diets of Infants and Children*, National Academy Press: Washington, D.C., 1993, p. 15.

[7] See George W. Ware, *The Pesticide Book*, Thomson Publications: Fresno, Calif., 1994, p. 6.

[8] Tobacco was North Carolina's largest crop in 1992, with $1.05 billion in cash receipts. Other leading crops, by rank, included: (2) greenhouse and nursery stock, $317 million; (3) soybeans, $201 million; (4) corn, $194 million; (5) cotton, $144 million; (6) peanuts, $126 million; (7) wheat, $83 million; and (8) sweet potatoes, $40 million.

[9] See Leonard P. Gianessi, "A National Pesticide Usage Data Base," 1986, and L.P. Gianessi and Cynthia Puffer, "Herbicide Use in the United States," 1990. Both studies published by Resources for the Future, 1616 P Street, NW, Washington D.C., 20036; telephone (202) 328-5000.

[10] From an unpublished report, "Pesticide Use Estimates in North Carolina in 1987," prepared for the N.C. Department of Agriculture.

[11] For the latest report, see *North Carolina Agricultural Statistics*, N.C. Department of Agriculture and U.S. Department of Agriculture, 1993.

[12] N.C.G.S. 143-437.3.

Farmworkers

—continued from previous page

include nausea, dizziness, sleeplessness, profuse sweating, skin rashes, and breathing difficulties. Farmworkers say such problems frequently occur after they've worked in fields such as tobacco that have been freshly sprayed with pesticides.

"When we come through, the leaves are still wet," says Irineo Garcia, a migrant worker from Michoacan, Mexico. "A lot of people get sick. We couldn't sleep at night, because when you lay down the house goes around and around. . . . When I used to work in tobacco, I got sick every year. That's one reason I quit."

Garcia's friend, Salud Solorio, also quit working in the fields, in part because of concerns about his health. Solorio spent over 30 years picking crops on farms in California, Florida, Michigan, and North Carolina. Yet he says none of those employers ever trained him about pesticide safety. "No, never," he says emphatically.

That situation was supposed to change in April 1994, when the U.S. Environmental Protection Agency's new farmworker protection regulations were supposed to take effect. But Congress delayed implementation of the rules until Jan. 1, 1995, in response to complaints from farmers and state agricultural agencies—including the N.C. Department of Agriculture.

The EPA's **Worker Protection Standard**[1] is aimed at protecting the estimated 3.9 million agricultural workers and others who are exposed to pesticides through their jobs. The regulations apply to pesticide handlers as well as workers in treated fields, greenhouses, forests, and nurseries. Under the rules, employers must provide workers with basic pesticide safety training, notify workers when applying pesticides, and post signs summarizing basic information about pesticide safety and first aid. Farmers also are supposed to restrict entry to fields for minimum time periods following pesticide applications, depending on the toxicity of the chemicals used.

"You could say that the meat of it has been delayed," Cardona says of the regulations. Definitely, that's a mistake. The vast majority of farmworkers have not received any sort of pesticide safety training. It seems that it ought to be a basic right that if you put someone in a hazardous situation, that you must train them how to act safely."

Tom Mather

Victoria Martinez, director of the Farmworkers Project in Benson, conducts a training session on pesticide safety.

"There's been a lot of concern from farmers, and rightfully so. This is a very major undertaking for them, and it's a situation where the state doesn't have a lot of choice."

—Alan York, Extension Specialist at N.C. State University
Chairman of the N.C. Pesticide Advisory Committee

Agricultural interests sought the delay because they said they needed more time to develop educational materials and train instructors. The EPA was supposed to provide model training materials to the states, but still hasn't completed them. Plus, much of the training must be conducted in Spanish, because many farmworkers are migrant laborers from Mexico and other Central American countries.

"There's been a lot of concern from farmers, and rightfully so," says Alan York, an extension specialist at N.C. State University and chairman of the state Pesticide Advisory Committee. "This is a very major undertaking for them, and it's a situation where the state doesn't have a lot of choice."[2]

Cardona, however, doesn't buy those arguments. "These regulations have been in the making for the past nine or 10 years," she says. "So, it's not like the growers, the commodity groups, and the states did not know this was coming down. In my opinion, that's a lame excuse. Anyone who's subjected to hazardous materials has a right to know that and at least know how to protect themselves."

—*Tom Mather*

FOOTNOTES

[1] 40 Code of Federal Regulations, Part 170.

[2] As quoted by Stuart Leavenworth, "State board may delay implementation of federal pesticide rules," *The News & Observer*, Raleigh, N.C., Nov. 9, 1993, p. 1A.

Tom Mather

Caroline Cordona, a health educator with Farmworkers Legal Services of N.C. in Newton Grove, says most migrant workers never receive any training about pesticide safety.

III

Enforcement of Pesticide Regulations in North Carolina

by Tom Mather

This article looks at the structure of North Carolina's three pesticide oversight and advisory boards, their powers and responsibilities, their enforcement actions, and their supporting agencies in the Department of Agriculture. The article also seeks to answer the following questions: Do the state's pesticide oversight and advisory boards include a balanced representation of public interests? Do those boards have fair and consistent methods for penalizing violators? What kinds of violations are most common among pesticide applicators? Do some types of pesticide users account for more violations than others? How does the state train, license, and certify pesticide applicators? In its research, the N.C. Center for Public Policy Research found that environmental interests are not fully represented on the state's pesticide oversight and advisory boards. The Center's review of enforcement records found that aerial applicators and exterminators had much higher violation rates than other groups of pesticide users. Proposals for curbing violations include harsher penalties for repeat violators, stricter limits on aerial spraying, and more extensive training requirements for exterminators and aerial applicators.

The Environmental Protection Agency may be the nation's final authority on pesticide regulation, but the top dog in North Carolina is the Department of Agriculture. That's because the EPA delegates its enforcement powers to a "lead" pesticide program in the states.[1] And North Carolina, like most states, has regulated pesticides through its agriculture department since the days when fly swatters were the primary means of pest control.

The N.C. General Assembly considered changing that arrangement in 1989, when it reorganized the state's environmental programs. At that time, the legislature consolidated most of the state's environmental agencies into the new Department of Environment, Health, and Natural Resources. But legislators—despite appeals from environmentalists—balked at moving pesticide regulation into the new "super agency" after hearing strong complaints from farmers and agricultural interests.

The N.C. Department of Agriculture is responsible for regulating more than 12,000 pesticide dealers, exterminators, crop dusters, lawn-service companies, and other commercial applicators—in addition to thousands of farmers and home gardeners. In doing so, the department's pesticide program employs about 80 people with an annual budget exceeding $4.1 million in FY 1992–93.

The administration of the state's pesticide program is complex, with key responsibilities divided among several divisions of the agriculture department as well as three boards. Much of the program's enforcement power rests with two panels, the Pesticide Board and the Structural Pest Control Committee, whose members are largely drawn from the ranks of agriculture, industry, and state government. A third panel, the Pesticide Advisory Committee, provides technical advice to the Department of Agriculture and the Pesticide Board but has no enforcement powers.[2]

This article looks at the structure of North Carolina's pesticide oversight and advisory boards, their powers and responsibilities, their enforcement actions, and their supporting agencies in the Department of Agriculture. (See Table 2 on p. 36.) The article also seeks to answer the following questions: Do the pesticide oversight and advisory boards include a balanced representation of public interests? Do those boards have fair and consistent methods for penalizing violators? What kinds of violations are most common among pesticide applicators? Do some types of pesticide users account for more violations than others? How does the state train, license, and certify pesticide applicators? In attempting to answer those questions, Center staff attended numerous board meetings, reviewed enforcement records over a five-year period, and interviewed various board members, agriculture officials, industry representatives, environmentalists, and public interest advocates.

North Carolina does not require any formal training for the "technicians" who apply pesticides for lawn service companies or structural pest control firms (exterminators).

John Rottet, The News & Observer

Pesticide Legislation in North Carolina

Like federal legislation, North Carolina's early pesticide laws primarily were aimed at protecting consumers and farmers by assuring the performance of pesticide products.[3] As stated in a state training manual for pesticide users, "Prior to 1971, North Carolina had neither laws to effectively limit the use or disposal of pesticides nor to see that most commercial pesticide applicators and dealers were qualified to apply or sell pesticides."[4]

That changed when the General Assembly adopted the **North Carolina Pesticide Law** of 1971.[5] The law is designed to regulate—in the public interest—the use, application, sale, disposal, and registration of pesticides. Like current federal legislation, the state law attempts to balance the benefits of pesticides with the hazards they can pose for the environment and public health. "The thrust of pesticide regulation has always been that they are necessary evils for the production of food and fiber," says John L. Smith, administrator of the state's pesticide program. The Pesticide Law also created the N.C. Pesticide Board to carry out, with the Commissioner of Agriculture, the enforcement of pesticide regulations; and the Pesticide Advisory Committee, to advise the board and the commissioner on technical matters.

"The thrust of pesticide regulation has always been that they are necessary evils for the production of food and fiber."

—JOHN L. SMITH, PESTICIDE ADMINISTRATOR
N.C. DEPARTMENT OF AGRICULTURE

John L. Smith, pesticide administrator for the N.C. Department of Agriculture

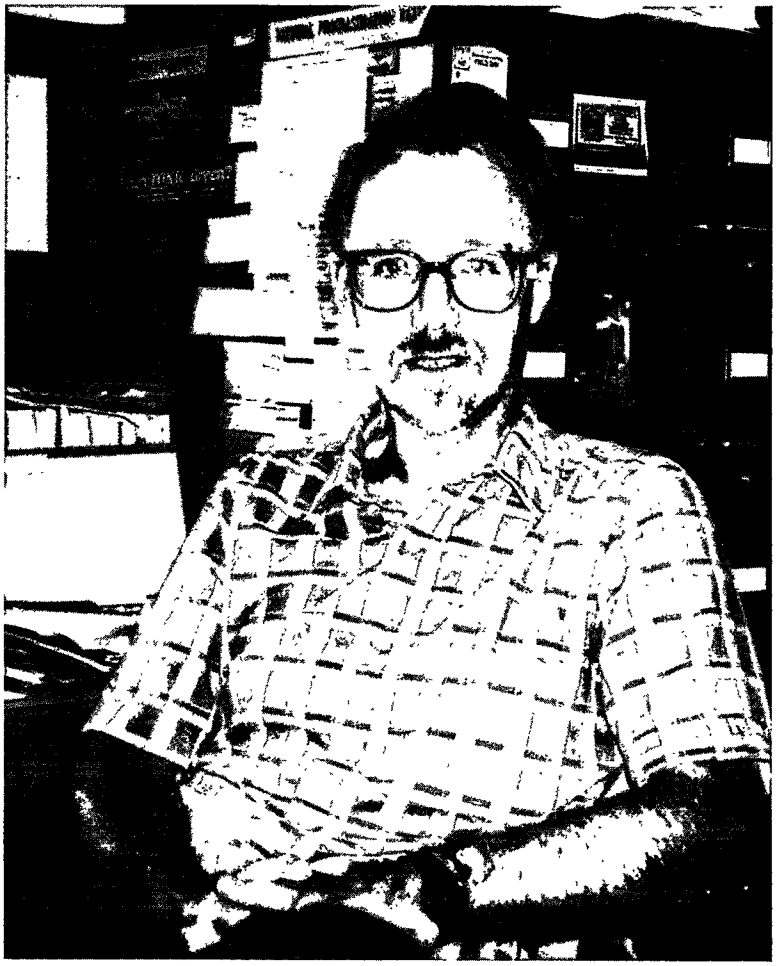
Tom Mather

Legislators have amended the Pesticide Law a number of times, often to comply with changes in federal pesticide regulations. A key change enacted in 1993 was a bill that created a Pesticide Environmental Trust Fund to help pay for new health and environmental programs.[6] The law imposes additional registration fees on pesticide products, with one-fourth of the funds being used to pay for agricultural-medical programs at North Carolina State University and East Carolina University. Three-fourths of the funds are earmarked for the Department of Agriculture's environmental programs, including the monitoring of groundwater pollution by pesticides and the disposal of pesticide containers.

The other key state legislation dealing with pesticides is the **North Carolina Structural Pest Control Law**,[7] originally passed in 1955 and since amended a number of times.

The law primarily deals with the training, certification, and licensing of structural pest applicators—that is, exterminators, termite-control applicators, and fumigators. It also established the Structural Pest Control Committee to adopt and enforce regulations.

In 1987, the General Assembly authorized the Legislative Research Commission to undertake a broad study of pesticide use in the state. The LRC's Committee on Pest Control—after considering more than 30 proposals dealing with pesticide regulation—made eight recommendations to the legislature's 1989 session.[8] Legislators have acted on several of those recommendations, including funding a groundwater monitoring program for pesticides and agricultural-medical programs at North Carolina State and East Carolina universities. However, the legislature has not acted on other recommendations, which include tighter limits on aerial applicators and a proposal for collecting data on pesticide usage and sales.



Allen Spalt, director of the Agricultural Resources Center in Carrboro

"The Pesticide Board, on paper, is fairly representative. But if you ever look into the backgrounds of the people who fill those seats, there's never been a conservationist appointed to that seat on the board—despite what it says on paper."

—Allen Spalt, Director
Agricultural Resources Center

The N.C. Pesticide Board

The seven-member Pesticide Board shares with the Commissioner of Agriculture primary responsibility for regulating pesticides in North Carolina. As specified by the Pesticide Law, the board's duties include:

- Adopting rules, regulations, and policies for pesticide use.
- Carrying out programs for planning, environmental and biological monitoring, and investigating long-range needs and problems concerning pesticides.
- Advising the public, private groups, other state agencies, and the governor on matters relating to pesticides.
- Recommending legislation concerning the management and control of pesticides.
- Preparing annual reports to the governor as

Table 2.
Duties and Membership of North Carolina's Pesticide Oversight Boards

	Pesticide Board	Pesticide Advisory Committee	Structural Pest Control Committee
AREAS OF RESPONSIBILITY			
Advising staff	Yes	Yes	Yes
Adopting or revising regulations	Yes	No	Yes
Setting policy	Yes	No	No
Hearing contested cases and appeals	Yes	No	Yes
Issuing or suspending licenses	Yes	No	Yes
Enforcing regulations	Yes	No	Yes
Fining violators	Yes	No	Yes
Allocating funds	Yes	No	No
GROUPS REPRESENTED ON BOARD			
Universities or colleges	No	Yes	Yes
Farmers	Yes	Yes	No
Agriculture industry	Yes	Yes	No
Public health	Yes	Yes	Yes
Agriculture department	Yes	Yes	Yes
Environmental or conservation groups	Yes[1]	Yes	No
Environment or natural resources agency	Yes	Yes	No
Chemical or pest control industry	Yes	Yes	Yes
Public at large	Yes	Yes	Yes
Farmworkers	No	No	No
Other	No	Yes	Yes
WHO APPOINTS MEMBERS			
Governor	7	0	3
Agriculture Commissioner	0	1	2
Secretary of Environment, Health, and Natural Resources	0	2	1
Secretary of Transportation	0	1	0
State Health Director	0	1	0
N.C. State University (department heads)	0	3	1
Pesticide Board	0	12	0
TOTAL MEMBERS	**7**	**20**	**7**

[1] Although the N.C. Pesticide Law specifies that the Pesticide Board should include a "non-governmental conservationist," no member of the current board meets that qualification.

well as any other reports or investigations as requested by the governor or the legislature.

- Exempting state or federal agencies from provisions of the Pesticide Law under emergency conditions.

The Pesticide Board works closely with the N.C. Department of Agriculture, which provides staff and administrative support. Together, the board and the department regulate: the control of crop and animal pests; the application of pesticides by commercial and private applicators; the training, certification, and licensing of applicators; the storage and disposal of pesticides; the sale, shipping, and registration of pesticide products; the testing of pesticide products for effectiveness; and penalizing violators.

Most administrative support for the Pesticide Board comes from the Pesticide Section of the department's Food and Drug Protection Division. Pesticide Administrator John Smith, who also serves as secretary to the board, heads a staff of

Table 3.
North Carolina Pesticide Board, 1994

I. Contact: John L. Smith, Pesticide Administrator
P.O. Box 27647, N.C. Department of Agriculture
Raleigh, NC 27611
(919) 733-3556

II. Membership:

Seven members appointed to four-year terms by the governor, including:[1]

1) *One member representing the N.C. Department of Agriculture:*
K. Ray Forrest of Raleigh
Assistant Commissioner, N.C. Department of Agriculture

2) *One member who shall be the State Health Director or his designee from the N.C. Department of Environment, Health, and Natural Resources:*
C. Gregory Smith of Raleigh
Public Health Physician, Division of Epidemiology

3) *One member who shall represent an environmental protection agency in the N.C. Department of Environment, Health, and Natural Resources:*
Linda Rimer of Raleigh
Assistant Secretary for Environmental Protection

4) *One member representing the agricultural chemical industry:*
R. Earl Ogle of Raleigh
Executive Secretary, Pesticide Association of N.C.

5) *One member directly engaged in agricultural production:*
Rudolph W. Jones of Benson

6–7) *Two at-large members from fields other than listed above, including one who is a nongovernmental conservationist:*
Jerry F. Coker of Plymouth
Lu Ann Whitaker of Raleigh

[1] Qualifications of members as defined in the N.C. Pesticide Law, N.C.G.S. 143–436. Current board officers are: Chairman, Jerry Coker; Vice Chairman, Ray Forrest; and Secretary, John Smith.

about 60 people. The program's budget totaled nearly $3.2 million in FY 1992–93.

The governor appoints all Pesticide Board members, who serve staggered four-year terms. (See Table 3 on p. 37 for a list of current members.) Members are supposed to represent the following interests: one from the N.C. Department of Agriculture; two from the N.C. Department of Environment, Health, and Natural Resources, one of whom is the State Health Director or his designee, and one representing an environmental protection agency; one from the agricultural chemicals industry; one directly engaged in agricultural production; and two at-large members from other fields, one of whom is to be a "non-governmental conservationist."

The board's membership has been a sore point with environmentalists, who say that governors often have not appointed members who truly represent conservation interests. That criticism appears to have validity, as neither of the board's current at-large members—both appointed by former Gov. James G. Martin—claim to fill the conservationist seat. Lu Ann Whitaker, a Raleigh homemaker, says she considers herself a consumer advocate. Board Chairman Jerry Coker is

Table 4.
North Carolina Pesticide Advisory Committee, August 1994

I. Contact: John L. Smith, Pesticide Administrator
P.O. Box 27647, N.C. Department of Agriculture
Raleigh, NC 27611
(919) 733-3556

II. Membership:

20 members appointed by the N.C. Pesticide Board or the heads of agencies represented, including:[1]

1–3) *Three practicing farmers:*
Charles P. Francis of Waynesville
Marshall W. Grant of Garysburg
Darryl Corriher of Rowan County

4) *One conservationist (at large):*
William Benson Kirkman of Raleigh

5) *One ecologist (at large):*
David A. Adams of Raleigh, N.C. State University (retired)

6) *One representative of the pesticide industry:*
Benny Rogerson of Raleigh, Uniroyal Chemical

7) *One representative of agri-business (at large):*
Charles G. Rock of Greensboro, Ciba-Geigy Corp.

8) *One local health director:*
Timothy Monroe of Greenville, Pitt County Health Department

9–11) *Three members of the N.C. State University School of Agriculture and Life Sciences, at least one of whom shall be from the areas of wildlife or biology:*
Peter T. Bromley of Raleigh, Department of Zoology
P. Sterling Southern of Raleigh, Department of Entomology
Alan C. York of Raleigh, Department of Crop Science

12) *One member representing the N.C. Department of Agriculture:*
John L. Smith of Raleigh, Pesticide Administrator

an engineer with Weyerhaeuser Co. in Plymouth.

"The Pesticide Board, on paper, is fairly representative," says Allen Spalt, director of the Agricultural Resources Center, a Carrboro-based environmental group. "But if you ever look into the backgrounds of the people who fill those seats, there's never been a conservationist appointed to that seat on the board—despite what it says on paper." Other observers familiar with the Pesticide Board say that Spalt overstates his assessment of members' qualifications. "This insinuates that you can be one or the other, but you cannot be both a conservationist and a professional," says Anne Coan, natural resources director for the N.C. Farm Bureau Federation. "This is not true."

The Pesticide Advisory Committee

The Pesticide Law of 1971 also established the Pesticide Advisory Committee. The 20-member committee provides technical advice on pesticides to the Agriculture Commissioner and the Pesticide Board. In addition, it can recommend policies, help develop regulations, and conduct detailed studies of issues—such as procedures for

13) *One member representing the N.C. Department of Environment, Health, and Natural Resources:*
Arthur Mouberry of Raleigh, Chief of Groundwater Section
Division of Environmental Management

14) *The State Health Director or his designee:*
W.A. "Bill" Williams of Raleigh
Pesticide Epidemiologist, Epidemiology Division
Department of Environment, Health, and Natural Resources

15) *One representative of a public utility or railroad company that uses pesticides:*
Joseph A. Gregory of Raleigh
Carolina Power & Light Co.

16) *One representative of the N.C. Board of Transportation:*
William D. Johnson of Raleigh
Landscape Unit, Department of Transportation

17) *One member of the N.C. Agricultural Aviation Association:*
M. Boyd Respess of Washington, N.C.
Dreamstreet Aviation Inc.

18) *One member of the general public (at large):*
Wanda Winslow of Asheville

19) *One member actively engaged in forest pest management:*
Coleman A. Doggett of Raleigh, Forest Resources Division
Department of Environment, Health, and Natural Resources

20) *One member representing the Solid Waste Management Division of the Department of Environment, Health, and Natural Resources:*
Larry D. Perry of Zebulon

[1] Qualifications of members as defined in the N.C. Pesticide Law, N.C.G.S. 143–439. Current committee officers are: Chairman, Alan York; Vice Chairman, Marshall Grant; and Secretary, John Smith.

monitoring groundwater contamination.

Like the Pesticide Board, the advisory committee's membership is supposed to represent a variety of interests. (See Table 4 on p. 38–39.) These include: three practicing farmers; one conservationist; one ecologist; one from the pesticide industry; one from agri-business; one local health director; one from a public utility or railroad company that uses pesticides; one from the public at large; one involved in forest pest management; one member of the N.C. Agricultural Aviation Association; one representing the state Health Director; one from the N.C. Department of Agriculture; one from the N.C. Department of Transportation; two from the N.C. Department of Environment, Health, and Natural Resources, one of whom represents the Solid Waste Management Division; and three faculty from the School of Agriculture and Life Sciences at N.C. State University, including at least one from the areas of wildlife or biology.

The directors of state agencies represented on the committee are responsible for appointing those members, while the Pesticide Board appoints the other members. As with the Pesticide Board, environmentalists have criticized the make-up of the advisory committee. "The problem with the advisory committee is not who fills the seats," Spalt says. "The basic problem is that different interests are not well represented on that committee."

Even some Pesticide Board members agree with that position. Greg Smith, a physician with the state Division of Epidemiology, recommended at an April 1994 meeting that the board reconsider its appointments to the advisory committee's ecologist and conservationist seats. In particular, Dr. Smith cited the ecologist seat, which was filled by John McLaurin, a retired farmer from Scotland County. "I don't know [McLaurin], and he may be a very nice gentleman," Dr. Smith told fellow board members. "But I really don't see anything in his biographical information that would suggest he has any background in ecology. I really don't think that particular position is filled appropriately."

The Pesticide Board initially rejected Smith's motion, citing McLaurin's background in soil conservation. But the board later agreed to reopen its nomination process and, in August 1994, replaced McLaurin with Dave Adams, a retired N.C. State University forestry professor.[9]

"The idea behind the regulatory program is: If you're going to use pesticides, let's use them correctly. Education is a big component of that."

—John L. Smith
Pesticide Administrator
N.C. Department of Agriculture

The N.C. Structural Pest Control Committee

The seven-member Structural Pest Control Committee is the state's oldest pesticide oversight board, dating back to the mid-1950s. Unlike the Pesticide Board, which is charged with protecting the environment and public health, the structural pest board is more explicitly concerned with consumer protection. The Structural Pest Control Act created the board "to ensure a high quality of workmanship and in order to prevent deception, fraud and unfair practices" in the extermination business.[10]

The act also created the Structural Pest Control Division to provide staff support to the committee and to administer programs for licensing exterminators and enforcing regulations. Division Director Ray Howell oversees a 20-person staff and serves as secretary to the structural pest committee. The division's budget totaled more than $950,000 in FY 1992–93.

The Structural Pest Control Committee is composed of seven members who serve terms ranging from two to four years. (See Table 5 on p. 42 for a list of current members.) Members are appointed by various state officials representing different interests. The Commissioner of Agriculture appoints two members, one from the Department of Agriculture and one from the general public. The dean of the College of Agriculture and Life Sciences at N.C. State University appoints one member from the entomology department. The Secretary of the Department of Environment, Health, and Natural Resources appoints one member who is an epidemiologist in the Division of Health Services. The governor appoints three members: two who are actively involved and licensed in the pest control industry; and one public member who is unaffiliated with the pest control or pesticide industry, the Department of

Tom Mather

State records show that aerial applicators have the highest violation rate among pesticide applicator types in North Carolina.

Agriculture, the Department of Human Resources, or the NCSU School of Agriculture. As with the other pesticide oversight panels, environmentalists have criticized the Structural Pest Committee for not including a broad enough range of public interests.

Licensing and Certification of Pesticide Applicators

A key responsibility of the state's pesticide program is the training of pesticide users, such as exterminators or aerial applicators. The Department of Agriculture regulates some 40,000 pesticide applicators through its licensing, certification, and registration procedures. (See Table 6 on p. 43 for a breakdown of applicators by type.)

"The idea behind the regulatory program is: If you're going to use pesticides, let's use them correctly," Pesticide Administrator John L. Smith says. "Education is a big component of that."

Certified private applicators, which include farmers who apply restricted-use pesticides, accounted for more than two-thirds (68 percent) of all registered applicators in 1992. Other types of users, listed in order of their numbers, include: commercial ground applicators, or those who apply pesticides for money (11.8 percent); structural pest control, or exterminators (9.7 percent); public operators, or those who work for governments and utilities (6.9 percent); dealers (2.5 percent); aerial applicators, or crop dusters (0.6 percent); and pest-control consultants (0.2 percent).

Licensing and certification requirements vary widely among the types of applicators. The Pesticide Board requires licenses for all dealers, commercial ground and aerial applicators, public operators, and consultants—but *not* for farmers, homeowners and other private applicators. To obtain licenses, applicators must pass exams showing their knowledge of pesticide laws, safety, uses, and application techniques. Licenses must be renewed annually.

In addition to licenses, anyone who uses *restricted-use* pesticides must be "certified" under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). The Pesticide Board automatically certifies all licensed applicators who pass qualifying exams. But farmers and other unlicensed users of restricted-use pesticides also must

qualify as certified private applicators, either by attending approved training sessions or passing an exam. *Farmers, homeowners, and other private applicators who don't apply restricted-use pesticides do not have to obtain licenses or certifications.* Both licensed and certified private applicators must periodically renew their certifications, either by attending training sessions or retaking the qualification exams.

The number of required training hours and the frequency of renewal for recertifications vary by the type of applicator. (See Table 7 on p. 47.) For instance, aerial applicators must earn four credit hours every two years to maintain their certifications. Applicators who treat ornamental plants and turf must earn 10 credits every five years. Certified private applicators must earn two credits every three years. Most other types of

Table 5.
North Carolina Structural Pest Control Committee, 1994

I. Contact: Ray Howell, Director
Structural Pest Control Division
P.O. Box 27647, N.C. Department of Agriculture
Raleigh, NC 27611
(919) 733-6100

II. Membership:

Seven members, including three appointed by the governor and four appointed by various state officials:[1]

1–2) *Two members appointed by the Commissioner of Agriculture, one from the Department of Agriculture, and one from the general public but not in the structural pest business:*
David S. McLeod of Raleigh, N.C. Department of Agriculture
John L. Parker of Williamston

3) *One member from the Department of Entomology at N.C. State University who is appointed by the dean of the College of Agriculture and Life Sciences:*
Michael G. Waldvogel of Raleigh

4) *One epidemiologist from the Division of Health Services who is appointed by the Secretary of the Department of Environment, Health, and Natural Resources:*
W.A. "Bill" Williams of Raleigh

5–6) *Two members appointed by the governor who are actively involved and licensed in the pest control industry:*
J.W. "Jay" Taylor III of Wilmington, Ter-ro Exterminating Co.
J.E. "Jimmy" Lynn Jr. of Raleigh, Surety Exterminating Co.

7) *One public member appointed by the governor who is unaffiliated with the pest control or pesticide industry, the Department of Agriculture, the NCSU School of Agriculture, or the Department of Environment, Health, and Natural Resources:*
Curtis Harper of Chapel Hill
UNC-CH Department of Pharmacology

[1] Qualifications of members as defined by the N.C. Structural Pest Control Law, N.C.G.S. 106-65.23. Current committee officers are: Chairman, David McLeod; and Vice Chairman, John Parker.

Table 6.
Pesticide Applicator Licenses and Certifications Issued by the N.C. Department of Agriculture, 1988–92

Type of License or Certification [1]	Annual Average 1988–92 [2]	Total Number 1992	Percent of Total 1992	Percent Change 1988–92
Certified Private Applicator[3]	28,650	27,209	68.0%	- 54%
Commercial Ground Applicator	3,509	4,723	11.8%	+ 76%
Structural Pest Control Applicator[4]	3,428	3,892	9.7%	+ 12%
Public Operator	2,443	2,779	6.9%	+ 61%
Pesticide Dealer	986	1,009	2.5%	- 2%
Aerial Applicator (Crop Duster)	194	220	0.6%	+ 23%
Pest Control Consultant	65	79	0.2%	+ 18%
Total	**58,229**	**39,991**	—	**- 41%**

[1] *Source:* N.C. Department of Agriculture. North Carolina has two main agencies that regulate pesticides, with administrative support for both provided by the Department of Agriculture. The N.C. Pesticide Board regulates most agricultural and commercial uses. The N.C. Structural Pest Control Division primarily regulates exterminators, or structural pest applicators. License numbers from the Pesticide Board are based on *calendar* years, while Structural Pest Division numbers are based on *fiscal* years starting with FY 1988–89.

[2] Average number of licenses, certifications, or registrations per year, 1988–92.

[3] Numbers of private applicators from 1991–92 only. The Pesticide Board first began requiring private pesticide applicators to renew their certifications in 1991, which accounted for a 51% decline in numbers from 1990 to 1991. Before 1991, numbers included many applicators who had died, moved out of state, or no longer applied pesticides.

[4] Includes all registered structural pest control applicators, of which 17% were licensees, 31% were certified applicators, and 52% were technicians over the five-year period.

applicators must earn from four to six credits every five years. However, some pesticide applicators are not required to get any training at all. For instance, the "technicians" who apply lawncare pesticides around people's homes are supposed to work under the supervision of licensed applicators but have no formal educational requirements.

The Structural Pest Control Committee has training requirements for three levels of exterminators: licensees, certified applicators, and registered technicians. No business may engage in structural pest control in North Carolina without at least one licensed applicator, the highest level. Licensees must pass a qualifying exam and have at least two years experience in the field or equivalent educational background. Plus, they must qualify as certified applicators. North Carolina had 596 licensed exterminators in FY 1992–93, accounting for 15 percent of the total registered structural pest applicators.

To qualify as certified applicators, exterminators must pass written exams demonstrating their knowledge in each phase of structural pest control in which they plan to work—including fumigation, household pests, and wood-destroying insects. North Carolina had 1,160 certified applica-

—continues on page 46

Crop Dusters Face Increasing Resistance

FARMVILLE—Despite 20 years of experience, Wayne Slaughter sometimes wonders if he should have heeded his father's advice about his chosen profession. "I grew up on a farm," he says. "When I told my father I wanted to fly, he said, 'OK, as long as you don't become a crop duster.'"

Slaughter, who runs an aerial application business in Pitt County, is past president of the N.C. Agricultural Aviation Association. But he is concerned about the future of his profession, he says, because the state and federal governments have slipped an ever-tightening noose of regulations on aerial applicators. Yet he acknowledges that crop dusters have an image problem these days.

"When I first started, I sprayed a man's field and I saved it," Slaughter says. "I was a hero. Now, I'm doing the same thing and I'm wearing a black cap. I'm afraid that our environmentalist movement has done a lot working with people's emotions, rather than the facts."

The facts, according to Slaughter and other aerial applicators, are that North Carolina's regulations governing aerial spraying are among the most stringent in the nation. For instance, the state prohibits the drifting of any pesticides off targeted fields. Plus, the state bans spraying in 100 to 300-wide buffer zones around homes, schools, hospitals, and other occupied buildings.

Wayne Slaughter, aerial applicator from Farmville

Tom Mather

A crop-duster pilot in Wyoming told me the life expectancy of a crop-duster pilot is five years. They fly too low. They hit buildings and power lines. They have no space to fly out of trouble, and no space to recover from a stall. We were in Cody, Wyoming, out on the North Fork of the Shoshone River. The crop duster had wakened me that morning flying over the ranch house and clearing my bedroom roof by half an inch. I saw the bolts on the wheel assembly a few feet from my face. He was spraying with pesticide the plain old grass. Over breakfast I asked him how long he had been dusting crops. 'Four years,' he said, and the figure stalled in the air between us for a moment. 'You know you're going to die at it someday,' he added. 'We all know it. We accept that; it's part of it.'

—Annie Dillard, *The Writing Life*

"There are tough regulations, and they enforce them," says Slaughter, who has been cited twice for violating aerial regulations. "They're not just adopting regulations that nobody follows. They're enforcing them too.

"We're cutting back on chemicals. We're only using exactly what is needed."

State records show that aerial applicators had the highest violation rate among various categories of pesticide users from 1988 to 1992. The violation rate for aerial applicators was four times higher than the next highest user category, exterminators. (For a further discussion of violations by applicator types, see pp. 52–54 in the article, "Enforcement of Pesticide Regulations in North Carolina.")

Aerial applicators say their high violation rate is due to their visibility and the large amounts of land they treat compared to other types of pesticide applicators. Pilots also blame public misconceptions about the dangers of pesticides. But if pesticides are so harmful to people's health, they ask, then why aren't more farmers and aerial applicators getting sick from using the chemicals?

"People forget that we live on these farms," Slaughter says. "We're the first ones who drink the water, who eat those crops. If something was going wrong, we'd be the first ones to know it.

"I've been in [aerial application] since 1974, and I've never been sick yet. Our national organization did a survey a few years ago, and that survey showed that the pilots, the ground crews, and their families were in much better health than the general public."

Aerial applicators have another strong incentive to minimize their use of agricultural chemicals—their costs. "We're using what we have to use," Slaughter says. "These [chemicals] are too expensive for us to do things wastefully. A lot of people have the misconception that farmers are out spraying stuff all over. But you can't just go out wasting chemicals. I have chemicals that cost over $2,000 per five-gallon container.

"I'm not saying we're problem free. But I think we've done a darn good job straightening out our industry. Most of the complaints I get now are from people who just moved to the country and don't know what I'm doing."

—Tom Mather

—*continued from page 43*

tors (not including licensees) in FY 1992–93, accounting for 30 percent of the total structural pest applicators. Like other types of pesticide applicators, both licensed and certified exterminators must renew their certifications periodically by attending classes or retaking exams. Educational requirements range from five to nine credit hours every five years, depending on the number of phases in which applicators are certified.

Registered technicians are the third category of structural pest applicators. Although technicians are not tested or formally trained, they are supposed to apply pesticides only under the supervision of certified applicators. Currently, the only training requirement for technicians is that they watch a 45-minute videotape dealing with safety issues. However, the Structural Pest Control Committee is considering more stringent requirements. The state had 2,136 registered technicians in FY 1992–93, accounting for 55 percent of the total structural pest applicators.

The N.C. Cooperative Extension Service conducts training sessions for all types of pesticide applicators, but the Department of Agriculture administers the licensing and certification exams. Between 1988 and 1992, the Pesticide Section administered 11,985 certification and recertification tests, with 78 percent passing the exams. During that same period, the Structural Pest Control Division administered 8,349 tests, with a 45-percent passing rate.

It is not my contention that chemical pesticides must never be used. I do contend that we have put poisonous and biologically potent chemicals indiscriminately into the hands of persons largely or wholly ignorant of their potentials for harm.

—RACHEL CARSON, *SILENT SPRING*

Enforcement of Pesticide Regulations

The Department of Agriculture and its oversight boards have a range of powers for enforcing pesticide regulations. These include the authority to conduct inspections, send warning letters, levy fines, suspend and revoke licenses, initiate criminal prosecutions, and require cleanups for accidents and spills. (The N.C. Center for Public Policy Research reviewed enforcement records for the Pesticide Section and the Structural Pest Control Division over a five-year period and those records are summarized in Table 8 on p. 48.)

Both pesticide agencies can conduct inspections, but the Structural Pest Division is more active in that regard. "We do many routine inspections," Division Director Ray Howell says. In 1992, the division conducted 10,046 inspections of structural pest control firms and the structures they treated for pests. By contrast, the Pesticide Section conducted 8,083 inspections in 1992 relating to pesticide storage, disposal, record-keeping, and product labeling and quality. In addition, the section investigated 232 complaints about pesticide violations in 1992.

Warning letters are perhaps the lowest level of formal enforcement action against violators. The state's pesticide oversight boards typically send warning letters for less serious offenses, particularly those involving private applicators or first-time violators. Over the five-year period, the two boards sent about 50 warning letters per year.

Civil penalties generally represent the next level of enforcement. Both oversight boards can levy fines as high as $2,000 per violation against commercial and licensed pesticide applicators. However, the Pesticide Board can fine private applicators (which includes most farmers) no more than $500 for each willful violation. In 1992, the two oversight boards assessed $55,790 in fines, about $2,000 more than the annual average from 1988–92. The Pesticide Board fined each violator about $500 on average over the five-year period, while the Structural Pest Committee's average fine was about $670.

Pesticide regulators consider *license suspensions* and *revocations* among the most serious actions they can take against violators, particularly commercial applicators. "Suspending or revoking a license is a really extreme action—because you're taking away a person's livelihood," says Carl Falco, assistant director of the structural pest division. "With most of these people, this is the only kind of work they know. If you suspend

their license, you put them out of business." From 1988–92, the two boards suspended about 11 licenses or certifications per year and revoked about five per year.

In extreme cases, both oversight boards can initiate *criminal prosecutions*. Although the Pesticide Board did not take any cases to court from 1988–92, the Structural Pest Committee averaged about 11 cases per year. Structural pest authorities say they have a larger number of prosecutions because—unlike the Pesticide Board—they don't have the authority to penalize *unlicensed* exterminators. So, those cases must be referred to the court system.

The Pesticide Board, unlike the Structural Pest Committee, has the authority to order *cleanups* for violations involving the leakage or spillage of pesticides. In 1992, the board ordered four cleanups, twice the annual average from 1988–92.

Table 7.
Training Requirements for Certified Pesticide Applicators in North Carolina

Pest Control Category[1]	Credit Hours of Training	Interval Between Certification Renewals	Hours of Training Per Year
Seed Treatment	3 hours	5 years	0.6
Certified Private	2 hours	3 years	0.7
Wood Treatment	4 hours	5 years	0.8
Right-of-Way	4 hours	5 years	0.8
Structural (1 phase) [2]	5 hours	5 years	1.0
Agricultural Pest/Animal	6 hours	5 years	1.2
Aquatic	6 hours	5 years	1.2
Forest	6 hours	5 years	1.2
Public Health	6 hours	5 years	1.2
Regulatory	6 hours	5 years	1.2
Structural (2 phases) [2]	7 hours	5 years	1.4
Structural (3 phases) [2]	9 hours	5 years	1.8
Aerial	4 hours	2 years	2.0
Agricultural Pest/Plant	10 hours	5 years	2.0
Demonstration/Research	10 hours	5 years	2.0
Ornamental/Turf	10 hours	5 years	2.0

[1] *Source:* N.C. Department of Agriculture. Pest control categories do not always correspond with types of pesticide applicators listed in Tables 6 and 10, because applicators can be certified in more than one category. Structural pest control applicators are certified through the N.C. Structural Pest Control Division, which regulates exterminators. All other applicators are certified through the N.C. Pesticide Board, which regulates most agricultural and commercial uses.

[2] Structural pest applicators can be certified in as many as three phases—fumigation, household pest control, and wood destroying insect control.

Table 8.
Pesticide Enforcement Actions by the N.C. Department of Agriculture, 1988–92[1]

Type of Enforcement Action	Pesticide Board		Structural Pest Control Division	
	Total 1992	Average 1988–92	Total 1992	Average 1988–92
Warning Letters	26	19.8	47	30.4
Board Actions	52	58.4	43	54.0
Court Cases[2]	0	0	12	10.8
Fines: Number	42	49.6	38	44.0
Total Fines	$18,840	$24,478	$36,950	$29,405
Average Fine	$449	$494	$972	$668
Revocations[3]	1	0.6	7	4.0
Suspensions[4]	12	6.4	4	4.8
Product Recalls	1	3.4	NA	NA
Cleanups Required	4	2.0	NA	NA
Total Inspections[5]	8,083	7,023	10,046	8,471
Pesticides Tested[6]	1,711	1,719	NA	NA

[1] *Source:* N.C. Department of Agriculture. North Carolina has two main agencies that regulate pesticide use, with administrative support for both provided by the Department of Agriculture. The N.C. Pesticide Board regulates pesticide use by farmers, aerial applicators, lawn-service companies, and other commercial applicators. The N.C. Structural Pest Control Division regulates exterminators, including household pest applicators, termite controllers, and fumigators.

[2] Court cases initiated by the Structural Pest Control Division all involved unlicensed and uncertified applicators.

[3] Includes all licenses, certifications, and registrations revoked or surrendered.

[4] Includes all licenses, certifications, and registrations suspended or modified.

[5] For the Pesticide Board, number includes all inspections relating to record-keeping, storage, disposal, and product labeling and quality. For the Structural Pest Control Division, number includes all inspections of exterminator firms and work sites.

[6] Number of pesticide products tested for purity and accuracy of labeling.

Consumer Protection Issues

In addition to policing powers, both pesticide boards and the Department of Agriculture have substantial responsibilities dealing with consumer protection and safety. The Pesticide Section tests about 1,700 pesticide products per year to ensure that they are effective, properly labeled, and registered.[11] The department's Food and Drug Protection Division also tests samples of fruits and vegetables to ensure that they don't contain pesticides at levels exceeding EPA tolerance limits.

Consumer protection is the primary focus of the Structural Pest Control Division. In fact, most of the division's enforcement activities are aimed at ensuring that exterminators adequately treat homes and buildings for termites and other pests. "Easily, 90 percent of what we do is dealing with wood-destroying insects," Falco says. "With our [violations], a lot of times—instead of for putting out too much pesticides or in the wrong place—it's for not putting out enough chemical."

Some exterminators say the division goes too far in that direction. David Nimocks, an applicator with Terminix in Fayetteville, says the division's standards require exterminators to apply much more pesticides than are needed to control termite damage. "Research shows that 7 parts per million [of pesticide] is enough to kill the termites," Nimocks says. "Yet, they're wanting us to apply at 500 ppm. Even those [homes] that are failing, they're still getting 70 ppm—10 times what they need to kill the termites."[12] Steve Taylor, owner of Capital Pest Services in Raleigh and past president of the N.C. Pest Control Association, says that excessive treatment standards cost consumers more money and pose safety hazards. "If you ask me to re-treat a house with 100 to 150 gallons of termiticide, at my cost," Taylor says, "it becomes a financial consideration and an environmental consideration."

Other exterminators and structural pest control officials, however, disagree with the contention that treatment standards are too high. "I don't think there's a problem with the numbers," says James E. Lynn, owner of Surety Exterminating Co. in Raleigh and a member of the N.C. Structural Pest Control Committee. "They [critics] are looking at the dollar signs. I question their sincerity." The committee adopted its standards, he says, based on the levels of chemicals needed to control termites as recommended by pesticide manufacturers and the U.S. Department of Agriculture's research laboratories. Plus, he says, the state needs standards that prevent structural pest damage for many years—to ensure that homeowners are protected.

Pesticide Violations by Type

What types of violations account for the most enforcement actions? The N.C. Center for Public Policy Research answered that question by reviewing the Pesticide Board's warning letters and settlement agreements from 1988–92. Enforcement actions were grouped into eight broad categories of violations, which sometimes overlap. The results of that analysis are shown in Table 9 on p. 50. [Structural pest actions were not reviewed because the vast majority of their violations involve applicators who apply too little termite-control chemicals to meet standards.]

The Center's review confirmed the saying among pesticide regulators that "the label is the law." Nearly half (43 percent) of the Pesticide Board's total enforcement actions over the five-year period involved *label violations*—that is, applicators who used pesticides "in a manner inconsistent" with the directions on product labels. Such violations can be very broad in scope, ranging from improperly mixing pesticides to spraying chemicals that drift away from the intended crop or pest. Nevertheless, the large number of label violations suggests that many applicators could be disregarding or failing to read the finely-printed directions on pesticide products.

The second-most common type of violation was the *non-licensed use* of pesticides, which

"Suspending or revoking a license is a really extreme action—because you're taking away a person's livelihood. With most of these people, this is the only kind of work they know. If you suspend their license, you put them out of business."

—Carl Falco, Assistant Director
N.C. Structural Pest Control Division

Table 9.
Types of Violations Cited by the N.C. Pesticide Board, 1988–92[1]

Description of Violation	Total Number of Actions[2]	Percent of Total[3]
Label Violations (Failure to use or apply pesticides according to directions on product labels.)	168	43%
Non-Licensed Use (Commercial use of pesticides by non-licensed or non-certified applicators, or use of restricted-use pesticides by non-certified applicators.)	118	30%
Drift/Deposit (Pesticide applications that drift or land on non-intended targets, crops, property, roads, autos, people, or water bodies.)	105	27%
Sales (Product recalls; sales by non-licensed dealers; sales to non-licensed or non-certified users; sales of illegal, mislabeled, or unregistered products.)	86	22%
Disposal (Improper disposal, spills, or leaks of pesticides.)	61	16%
Storage (Improper storage, transportation, or labeling; lack of fire plan or inventory.)	37	9%
Non-Approved Use (Application of pesticides that are illegal, not registered, or not approved for target crops or pests.)	36	9%
Other (Fish or animal kills; contamination of food products.)	14	4%
Total Number of Cases[4]	391	—

[1] *Source:* N.C. Department of Agriculture. The N.C. Pesticide Board regulates agricultural and most commercial uses of pesticides. Table does not include actions taken by the N.C. Structural Pest Control Divison, which primarily regulates exterminators.

[2] Total number of warning letters and settlement agreements that cited type of violation, 1988–92.

[3] Percentage of total warning letters and settlement agreements that cited type of violation. Total is greater than 100 percent because warning letters and settlement agreements often cite applicators for multiple violations.

[4] Sum of total actions does not equal total number of cases because individual cases can involve more than one type of violation.

accounted for nearly a third (30 percent) of all enforcement actions. Many of the license violations involve the application of restricted-use pesticides by nonlicensed or noncertified applicators—or those with expired licenses and certifications. Also included were those who applied general-use pesticides *commercially* without first obtaining a license, or those using expired licenses. An example of a typical license violation is a landscape gardener who applies pesticides for pay without first obtaining a license and certification. Although license violations usually result in minimal damages, the large number of such incidents suggests that many commercial pesticide users are not aware of licensing and certification requirements—or they just ignore the requirements.

More than one-fourth (27 percent) of the violations involved *drift/deposit* incidents in which pesticide sprays landed or drifted away from the targeted crop or pest. Such incidents are among the most serious violations because the pesticides involved can harm people's health. Drifting sprays also can damage non-targeted crops and gardens, pollute lakes and streams, and cause large fish and bird kills. Many of the drift violations involve gardeners and farmers who inadvertently spray pesticides on neighbors' property, often with minimal damage. But drifting pesticides landed on people and water bodies in more than 15 percent of the incidents over the five-year period.

Other types of enforcement problems included:

- *Sales violations* were involved in more than one-fifth (22 percent) of the pesticide enforcement actions. Such violations include: product recalls; sales of restricted-use pesticides by nonlicensed dealers; sales of restricted-use chemicals to nonlicensed and noncertified applicators; and sales of illegal, mislabeled, or unregistered products.
- *Disposal violations* were involved in 16 percent of the total incidents. Such violations include spills, leaks, and improper disposal of pesticide products.
- *Storage violations* were involved in 9 percent of the incidents. Such violations include storing pesticides in improper containers, incorrect labeling of products, transportation problems, and lack of inventories and fire plans.
- *Non-approved uses* were involved in 9 percent of the violation incidents. Such violations can include: using banned, illegal, or nonregistered pesticides; and using pesticides on crops or pests for which they are not approved.
- *Other* uncommon and varied violations—ranging from bee kills to the contamination of food products—were involved in 4 percent of the enforcement actions.

Violations by Pesticide Applicators

The Center also analyzed enforcement records to determine which types of pesticide applicators accounted for the most violations. (See Table 10 on p. 52 and Figure 5 on p. 53.) In *total numbers*, structural pest applicators were responsible for the most violations (37 percent), followed by unlicensed users (25 percent), certified private applicators (12 percent), commercial applicators (11 percent), aerial applicators (8 percent), dealers (5 percent), public operators (2 percent), and consultants (0.1 percent).

However, just looking at total violations does not take into account the number of applicators in each user category. A truer measure of compliance is the violation rate—*or, the number of violation incidents per applicator by type.*[13] For example, although private applicators were involved in the second-highest number of incidents (81), they had the lowest violation rate (0.3 percent). By contrast, aerial applicators had the highest violation rate by a wide margin. Aerial applicators were involved in 27 violation incidents for every 100 licensed applicators—a rate four times higher than the next highest category, structural pest applicators (7.4 percent). All other categories of pesticide applicators had violation rates of 3 percent or less.

Aerial and structural pest applicators also accounted for virtually all of the *repeat* violators of pesticide regulations. (See Table 11 on p. 55.) Over the study period, seven structural pest applicators and five aerial applicators were involved in three or more violation incidents.

The higher violation rates and numbers of repeat offenders among aerial and structural pest applicators raise serious concerns. That's because those two groups of applicators have perhaps the greatest potential to affect public health and the environment. Although there are fewer than 200 licensed aerial applicators in North Carolina, such pilots typically treat much larger acreages of land than ground applicators. Plus, aerial-applied sprays are much more likely to drift off target. One researcher reports that 50 to 75 percent of the aerial-applied pesticides miss their target—compared to 10 to 35 percent for ground-applied chemicals.[14] Although structural

pest applicators do not generally have problems with drift, they apply pesticides in and around thousands of homes and occupied structures—with the potential to affect people, pets, and private wells.

Several factors could help account for the higher violation rates and repeat offenses among aerial and structural applicators. Pilots say aerial problems are exaggerated by three factors: their high visibility; the large amounts of land they treat relative to other types of applicators; and the strictness of North Carolina's regulations, which they describe as among the harshest in the nation. "It is very nearly impossible for an aerial applicator to apply chemicals in North Carolina without breaking a regulation," says Boyd Respess, a Beaufort County pilot and board member with the N.C. Agricultural Aviation Association.

North Carolina's aerial regulations prohibit the application or drift of any pesticide off a targeted site. In addition, the rules prohibit the deposit or drift of any pesticides within 25 feet of a public road, 100 feet of any residence, and 300 feet of schools, churches, hospitals, nursing homes, or other occupied buildings. Ground applicators of pesticides do not have to comply with those buffer zones. "A lot of the ground rigs are still spraying when we shut down—because we have

Table 10.
Violations of North Carolina Pesticide Regulations by License or Certification Type, 1988–92

License or Certification Type	Number of Licenses[1]	Total Incidents[2]	Percent of Total[3]	Violation Rate[4]
Aerial Applicators	194	53	7.9%	27.3%
Structural Pest Applicators[5]	3,428	252	37.4%	7.4%
Pesticide Dealers, Producers	986	30	4.5%	3.0%
Commercial Pesticide Applicators	3,509	74	11.0%	2.1%
Pest Control Consultants	65	1	0.1%	1.5%
Public Operators	2,443	14	2.1%	0.6%
Certified Private Applicators	28,650	81	12.0%	0.3%
Unlicensed Violators[6]	NA	169	25.1%	NA

[1] *Source:* N.C. Department of Agriculture. Average annual number of licenses or certifications by category, 1988–92, except private applicators, which are averaged from 1991–92. The number of private certifications per year dropped about 50 percent in 1991, when the N.C. Pesticide Board began requiring periodic renewals of certifications. (Previously, they had been permanent.)

[2] Total violation incidents per category, 1988–92, that culminated in regulatory actions such as hearings or settlement agreements.

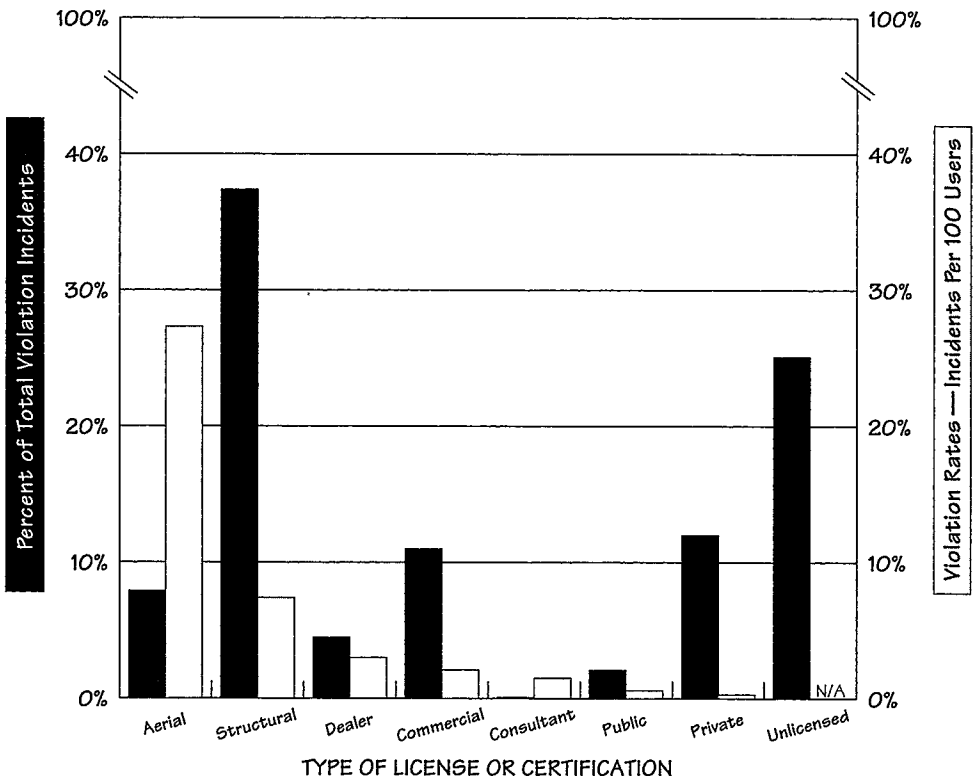
[3] Percent of total violation incidents per category, 1988–92.

[4] Violation Rate = Total Violations/ Number of Licenses x 100.

[5] Average annual number for all registered structural pest control applicators (exterminators), including licensees, certified applicators, and technicians.

[6] Includes unlicensed or uncertified users cited for violations by the Pesticide Board or the Structural Pest Control Division.

Figure 5.
Violations by Pesticide Applicator Types, 1988–92



Source: N.C. Department of Agriculture

to pay a lot closer attention to the weather," says Wayne Slaughter, a Farmville aerial applicator and past president of the N.C. Agricultural Aviation Association.

Structural pest regulators say the higher violation rate for exterminators is primarily due to their rigorous inspection program. Plus, they say, few of the structural pest violations pose safety or environmental hazards. Instead, most structural violations involve exterminators who have not applied enough insecticides to meet standards for preventing termite damage. "Most of those violations do not represent misuse of structural pest control chemicals," says Steve Taylor, the Raleigh exterminator. "Most of them have to do with paperwork violations or not putting down enough chemicals." Nevertheless, such violations can be very serious to a person whose home has been damaged by a termite infestation related to improper treatment.

Some exterminators also question the higher number of repeat offenses among structural pest applicators. That number is inflated, they say, because the Structural Pest Control Division generally cites licensed or certified applicators for substandard work done by the registered technicians who work under their supervision. "The problem with being a licensee in North Carolina is that you can have 100 employees, and if one of them screws up, you're responsible for it," says S. Alan King, a Rocky Mount exterminator.

Nevertheless, misapplications of pesticides by exterminators can have serious health and environmental consequences—because such chemicals often are applied in close proximity to living areas. State records show that some applications

of pest-control chemicals have contaminated wells, filled homes with noxious fumes, and even caused fish kills. (See the accompanying article, "Contaminated Wells, Odor Problems Sometimes Result from Exterminator Treatments," on pp. 16–18 for a discussion of potential hazards from structural pest control applications.)

Proposals for Reducing Excess Violations

Some observers, however, say the Department of Agriculture and its oversight boards should take further steps to reduce violations from exterminators and aerial applicators. "These are the two areas that are the most risky," says Spalt of the Agricultural Resources Center, the Carrboro environmental group that focuses on pesticides. The group is particularly concerned about aerial applicators because the pesticides they spray can spread far and wide.

"Drift from aerial applications can go literally miles," says Spalt, whose group supports a number of proposals aimed at preventing potential harm from aerial drift.[15] Some of those proposals include:

- Increasing the buffer zone where aerial spraying is prohibited from 100 feet to 300 feet around residences.[16]
- Mandatory liability insurance for aerial applicators to pay for potential damages caused by accidents or misapplications of pesticides.[17]
- Requiring aerial applicators to notify people living or working near crop sites before applying pesticides.

Other proposals for limiting excess violations include more extensive training requirements and harsher penalties for repeat violators. Currently, the number of training hours needed for aerial applicators and exterminators to renew their certifications are not much different than for other user groups with much lower violation rates. (See Table 7 on p. 47.) Spalt of the Agricultural Resources Center says better training is particularly important for registered structural pest control technicians—who account for more than half of all exterminators yet are not tested or certified for their knowledge of pesticide safety. The same situation exists for the horticultural technicians who apply insecticides and herbicides for lawn service companies.

"The technicians are supposed to be operating under direct supervision, which means a certified applicator should be on site with them," Spalt says. "But under direct supervision has been interpreted to mean in radio contact with a certified applicator. You can't supervise how somebody is applying pesticides if you're back in the office. It's a legal responsibility, rather than a preventive action for homeowners' safety."

James Lynn of the Structural Pest Control Committee, says most pest control firms have certified applicators accompanying their technicians while treating homes. But Lynn supports the adoption of stronger training and certification requirements for *all* exterminators. "Most people in this industry would rather see an industry that has nothing but certified applicators in it," Lynn says. "I think we need to increase the training requirements. I think there ought to be a yearly requirement."

The large number of violations by *unlicensed* applicators suggests that state could do a better job of educating home gardeners about safe pesticide use. Although the N.C. Department of Agriculture and the Cooperative Extension Service can provide free brochures on pesticide safety, such information often is not available at garden shops, nurseries, and other places where consumers purchase such chemicals.

"The Department of Agriculture may think they do a good job of increasing public awareness about the safe use of pesticides, but very few occasional gardeners know that 'the label is the law,'" says Mary Joan Pugh, a former member of the N.C. Pesticide Board. "Most people think the label on any pesticide product is just a guide."

Critics Say Penalties Not Consistent

Others say the Department of Agriculture needs to revamp its system for penalizing violators, particularly those cases that are handled through the Pesticide Board. Critics—including some Pesticide Board members—say the panel's fines often are inconsistent and don't reflect the severity of violators' offenses. Plus, repeat offenders account for a large number of the violation incidents among some groups, such as aerial applicators. For example, repeat offenders were involved in about 45 percent of all aerial application incidents in 1991 and 1992.

Much of the problem results from the way the Pesticide Board sets penalties—by negotiating the amounts of fines and lengths of suspensions with violators or their attorneys, says board member Greg Smith, a physician with the state Depart-

Table 11.
Top Repeat Violators of North Carolina Pesticide Regulations, 1988–92[1]

Name	Number of Violation Incidents[2]	License Type[3]	Total Fines	Other Penalties
Roy W. Wood, Wood Spraying Service, Raeford (Hoke)	6	Aerial	$3,950	6 months suspension
Herman Ray Meads, Elizabeth City (Pasquotank)	6	Aerial	$2,800	none
Dudley Carroll Vann, Vann Aero Service, Greenville (Pitt)	5	Aerial	$1,700	1 month suspension
S. Alan King, King Exterminating Co. of the Coast, New Bern (Craven)[4]	4	Structural	$9,900	3 months probation
Henry F. Kessler, Southern Pest Control, Charlotte (Mecklenburg)	3	Structural	$2,000	18 months probation
Boyd W. Childers, C&C Exterminating Co., Hickory (Catawba)	3	Structural	$1,400	none
Richard V. Hanson Jr., Spirittine Exterminators, Wilmington (New Hanover)	3	Structural	$1,050	none
Isaac Floyd Jr., Floco Pest Control Inc., Rocky Mount (Edgecombe)[5]	3	Structural	$900	none
Randall A. Hill, Ranger Helicopter Services, Roanoke, Va.	3	Aerial	$700	16 months suspension
John W. Fleming Jr., Fleming Pest Control, Mount Airy (Surry)	3	Structural	$600	license revoked
Arvel R. Hill, H&L Pest Control, Dallas (Gaston)	3	Structural	$500	18 months probation
Farmway Chemical Corp., Farmingdale, N.Y.	3	NA[6]	$400	NA
Alvin R. McCraw, Hendersonville (Henderson)	3	Private	$300	1 month suspension
John Steve Newsome, Newsome Spray Service, Woodland (Northampton)	3	Aerial	0	3 months suspension

[1] *Source:* N.C. Department of Agriculture. Based on enforcement records from the N.C. Pesticide Board, which primarily regulates agricultural uses of pesticides, and the N.C. Structural Pest Control Division, which primarily regulates exterminators.

[2] Total number of settlement agreements and hearings in which applicator was cited from 1988 to 1992.

[3] Aerial = Aerial applicators of pesticides; Structural = Exterminators or structural pest control applicators; Private = Private certified applicators, including most farmers.

[4] King is also affiliated with King Exterminating Co. of Rocky Mount (Nash), which was not responsible for the violations listed above.

[5] Floyd is now affiliated with Mantis Pest Control of Rocky Mount, which was not responsible for the violations listed above.

[6] Not applicable — company not registered in North Carolina.

ment of Environment, Health, and Natural Resources. "It's a negotiated settlement, and it all depends on how good a negotiator someone is," says Dr. Smith, who compares the process to buying an automobile. "Some people pay full price for a car, and some people get 10, 20, or 30 percent off—depending on how good a negotiator they are. I'm not sure that's the best way to go."

To illustrate his point, Smith asked the Pesticide Section to prepare a report on repeat violations by aerial applicators from 1983 to 1992. The report showed a wide range of penalties for comparable violations, with repeat violators sometimes receiving more lenient penalties than first offenders. Consider the following examples, all involving pilots:

- Randall A. Hill of Roanoke, Va., was fined $700 in 1992 for his first violation incident. That same year, he received a 16-month suspension for his second and third incidents.
- H. Ray Meads of Elizabeth City was fined $250 in 1985 for his first violation incident. In 1990, Meads was fined $2,500 for five separate violation incidents. Yet he was fined only $300 for a seventh incident in 1991. Meads received a two-month suspension for an eighth incident, but he has appealed that penalty.
- J. Steve Newsome of Woodland received a one-month suspension in 1989 for his first and second violation incidents. In 1992, he received a two-month suspension for his third incident.
- D. Carroll Vann of Greenville was fined $1,200 in 1990 for his first violation incident, yet only received a warning letter in 1992 for his second and third incidents. In 1993, he was fined $500 and received a one-month license suspension for his fourth and fifth incidents.

In other cases, Smith has chided the board's staff for negotiating settlement agreements that don't reflect the severity of violations. For example, in March 1994, Smith urged the board to reject a $400 settlement for a Wilmington golf-course owner charged with ordering his employees to apply paraquat to greens and fairways. "I think the $400 settlement is too low," Smith told fellow board members. "Not only did this person knowingly break the law, but he also endangered the health and well-being of his employees. This particular pesticide is responsible for many, many cases of poisoning throughout the world."[18]

For the sake of consistency, Smith has suggested that the Pesticide Board and the Department of Agriculture develop an enforcement matrix that sets standard fines and penalties based on factors such as the severity of violators' offenses, public health concerns, environmental damages, and prior offenses. Such a system would work like the "point system" for traffic violators in which repeat offenders can receive higher fines or get their licenses suspended. "What you want to do is get the bad apples out," Smith says. "But for those who make very minor violations, I can't see the purpose in dealing with them too harshly."

"What you want to do is get the bad apples out. But for those who make very minor violations, I can't see the purpose in dealing with them too harshly."

—Dr. Greg Smith, Physician
N.C. Division of Epidemiology
Member of N.C. Pesticide Board

The Department of Agriculture's Structural Pest Control Division already uses an enforcement matrix in setting penalties for exterminators who violate regulations, Division Director Ray Howell says. "We have developed a matrix, and we use that to try and develop consistency," Howell says. Records show that the Structural Pest Control Committee penalizes repeat violators more consistently than does the Pesticide Board. For example, the panel typically fines exterminators about $200 for a first offense, $400 for a second offense, and $600 for a third offense.

The use of penalty matrices also is commonplace in other state agencies with regulatory enforcement powers, such as the N.C. Division of Environmental Management. Former division director George Everett says that "a predictable response" is an essential component of an enforcement program. "I found that an enforcement matrix or penalty schedule did help in making enforcement more consistent," says Everett, now executive director of the Chemical Industry Council of N.C. "I also believe that repeat violators should be dealt with aggressively. Single violations in a program that has rules as strict as the aerial [applicator] program in North Carolina should not be unexpected. However, repeat

—continues on page 60

Woman Blames Husband's Death on Aerial Application

WAGRAM—Aerial application of pesticides is a risky business, and sometimes things go wrong. Perhaps the most serious problem is when winds or careless applications cause aerial pesticide sprays to land on people. Such incidents, although relatively infrequent,[1] can be traumatic for those involved—such as Jim and Faye Pickron.

Four years ago, the Pickrons settled in rural Scotland County with plans to retire there and raise goats for a living. But their plans have taken a tragic turn since the summer of 1992, when the Pickrons say they were doused with pesticides from an aerial applicator.

The Pickrons' home is about two miles outside Wagram, on a wooded lot bordered on two sides by a cotton field. A blue-and-white aircraft sprayed the field a number of times during July 1992, Faye Pickron says, with the drifting chemicals landing on four people on two different occasions. The first time, both Pickrons were sprayed while they were out in their yard. "Jim told me to go in the house and take a shower," she says. "But he went right on working." The second time, Jim Pickron and two workers were building a fence for a goat pen, and all three men were sprayed.

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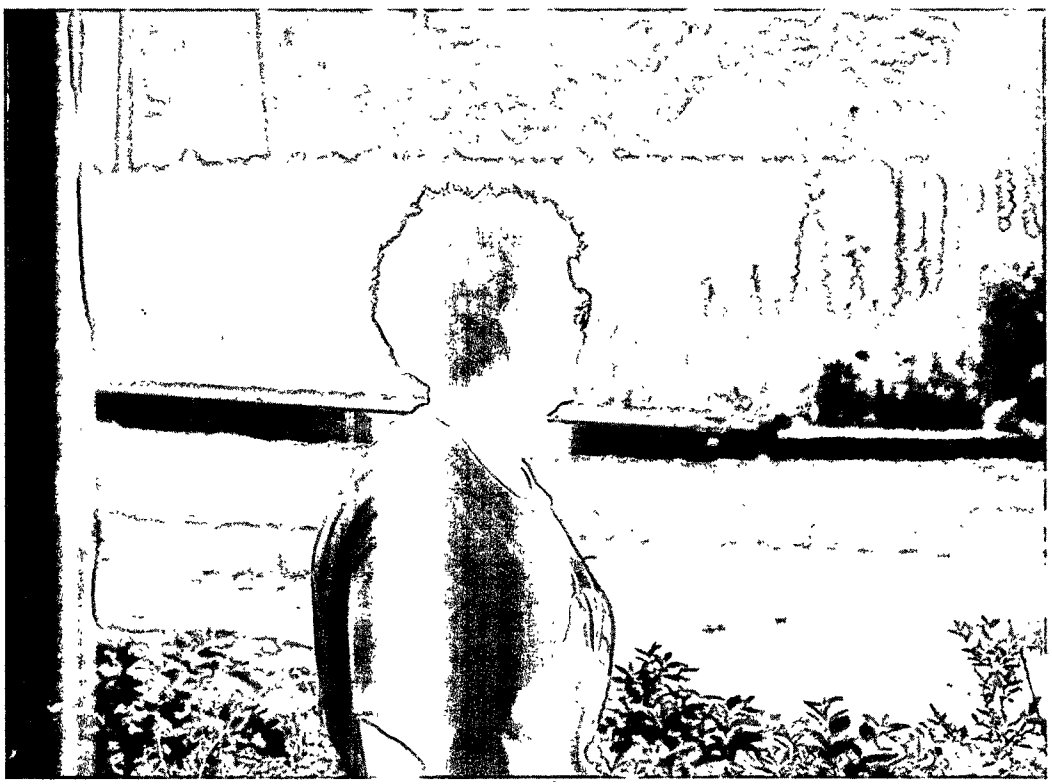
Faye Pickron looks over the cotton field next to her yard, where she and her husband were sprayed by an aerial applicator.



Myron Dowell

Aerial

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"Every time [the pilot] came by, he went right over the trees," Faye Pickron says. "He knew it was against the law to spray so close to a house. So, why did he do it? That's what I don't understand."

Faye Pickron says the pesticide spray stung their skin and caused one of the workers to get sick to his stomach. Shortly after the incident, she says, their dog lost a litter of puppies and their goats started dying. Then, Jim Pickron started getting sick. Faye Pickron says her husband was in excellent health before he was sprayed by the pesticides. "He had a complete physical in June," she says. "Everything was fine, and then in August all these problems came up."

In August 1992, Jim Pickron's physician diagnosed his illness as lung cancer. He died from the cancer on Dec. 8, 1993. Faye Pickron blames the pesticide spraying for her husband's illness and death. "I think this spraying is what's killing a lot of people," she says. "I'll always believe it."

"Every time [the pilot] came by, he went right over the trees. He knew it was against the law to spray so close to a house. So, why did he do it? That's what I don't understand."

—FAYE PICKRON OF WAGRAM
WOMAN SPRAYED BY AERIAL APPLICATOR

The N.C. Department of Agriculture identified the pilot as William Larry Upchurch of Owens Air Service in Raeford. Department investigators cited Upchurch for seven different violations, including operating "in a faulty, careless or negligent manner" and depositing pesticides within 100 feet of a residence. Investigators also found residues of the insecticide Ammo (cypermethrin) in vegetation samples from the Pickrons' yard and their goat pen. In June 1993, the N.C. Pesticide Board fined Upchurch $2,000—the maximum allowed under North Carolina law for a pesticide violation. The board did not suspend his license.

Upchurch paid the fine, but says he never saw any people outside when he sprayed the cotton field next to the Pickrons' yard. "They were in the woods building a goat pen when they were sprayed," Upchurch says. "I couldn't see anybody."

Upchurch says he can sympathize with Faye Pickron's grief over her husband's death because his own father died of cancer about the same time. But he says there is no way his spraying could have caused Pickron's cancer or killed the goats.

"There were a lot of accusations that I don't think were justified," he says. "The whole thing was an accident. None of us in the aerial application business want to hurt anybody."

State records show that aerial applicators have the highest violation rate among various categories of pesticide users in North Carolina. The violation rate for aerial applicators was four times higher than the next highest user group (exterminators) from 1988 to 1992. (For more details on violations by applicator types, see the article, "Enforcement of Pesticide Regulations in North Carolina," on pp. 32–60. For a view of regulations from an aerial applicator's perspective, see "Crop Dusters Face Increasing Resistance," on pp. 44–45.)

Despite problems with some aerial applicators, state agriculture and health officials discount Faye Pickron's contention that the aerial spraying caused her husband's

cancer and killed their goats. Pickron also had smoked cigarettes for many years before quitting in the late 1980s.

"Linkages are being made that shouldn't be made," says Dr. Greg Smith, a physician with the state Division of Epidemiology. Smith, a member of the Pesticide Board, says that he can find no scientific evidence that Ammo (cypermethrin)—the pesticide reportedly sprayed on Pickron—causes cancer in people or animals. Plus, he says, adult lung cancer invariably takes many years to develop. "In conclusion, it is not biologically plausible that Mr. Pickron developed and died of lung cancer 18 months after his reported exposure to the pesticide Ammo," Dr. Smith says. "Without a doubt, his lung cancer began many years prior to [July 1992], the date of his reported exposure."[2]

The pesticide's effect on the Pickrons' goats also has been questioned. Cypermethrin has "low toxicity" for mammals and birds, according to laboratory tests conducted by FMC Corp., the manufacturer of Ammo. In addition, veterinarians with the Pembroke Veterinary Hospital in Robeson County and the Department of Agriculture's Rollins Animal Disease Diagnostic Laboratory in Raleigh examined five of the goats and found no evidence of pesticide poisoning. The veterinarians did find other health problems with the goats, including worms, pneumonia, mastitis, and encephalitis.

But Faye Pickron's brother, Harry Clark of Red Springs, who owned half of the goats on the Pickrons' property, is convinced that the pesticide sprays killed their goats and other animals. "I've been messing with goats for about 17 years," says Clark, who says the animals were healthy before the spraying started. "We had 110 goats," he says. "We lost 98 of them. One day, they would be walking around looking real healthy. Three days later, they'd be dead. We lost as many as seven goats in a day. We lost a whole litter of puppies—six of them—two days after he sprayed."

State agriculture officials say there is no doubt that Upchurch violated state regulations limiting aerial applicators. But they could find no evidence tying the aerial drift to the deaths of Jim Pickron or his goats.

"It's obvious that Mr. Upchurch violated the regulations," says John Hunter of the N.C. Pesticide Section's enforcement staff. "There was chemical all over the property. What it did to the goats, I can't say. But whether Mr. Pickron got cancer from the spraying, I doubt it, especially since he was going to see the doctor about the time he was sprayed."

—Tom Mather

FOOTNOTES

[1] The N.C. Center, in its review of enforcement records from the N.C. Department of Agriculture, identified 17 incidents in which drifting pesticide sprays landed on people—or 4.3 percent of the total cases from 1988 to 1992. These cases involved both ground and aerial applicators.

[2] As quoted from a letter from Greg Smith to the *Fayetteville Observer-Times*, dated April 27, 1994. Smith's letter was in response to an article by Michael Fabey, "He blamed his cancer on spray—until he died," *Fayetteville Observer-Times*, March 23, 1994, p. 1A.

"There were a lot of accusations that I don't think were justified. The whole thing was an accident. None of us in the aerial application business want to hurt anybody."

—W. Larry Upchurch of Raeford
Pilot fined for spraying
pesticides improperly

—*continued from page 56*
violators should be dealt with forcefully, and the use of suspensions and revocations can be very effective deterrents."

Pesticide Administrator John Smith says that adopting an enforcement matrix could limit the Pesticide Board's flexibility in considering all of the factors involved in cases. The Pesticide Section generally relies on the severity of violations in negotiating fines and suspensions, he says, but the agency deals with a much wider range of applicators and incidents than the structural pest division. Although Smith acknowledges that inconsistencies occur in some cases, he says that—"over the long haul"—more serious violations tend to earn harsher fines and suspensions. "You can mess up bad enough on the first incident to lose your license completely in North Carolina," he says.

Nevertheless, a number of current and past Pesticide Board members say they are confused by the Pesticide Section's negotiation process and support the development of a penalty matrix. "I think we really need to go in that direction," says board member Lu Ann Whitaker of Raleigh. "We need to have some way to determine whether we're giving [violators] a fair penalty. And we need to do something about the repeat offenders." Mary Joan Pugh, a past board member, says: "If you're going to have any consistency or any fairness, then you need to have some kind of a penalty matrix as a guide."

(Michele Arens, a Duke University law student, provided research assistance for this article.)

FOOTNOTES

[1] At the time of the Center's survey of state pesticide programs (August 1993), Nebraska was the only state that lacked enforcement powers. Since then, however, the Nebraska legislature has enacted legislation enabling the state to assume pesticide enforcement responsibilities from the EPA.

[2] For more information on the state's pesticide oversight boards and their relation to other such panels, see the N.C. Center for Public Policy Research's report, *Boards, Commissions, and Councils in the Executive Branch of North Carolina State Government*, 1984, pp. 77–95 and 192–194.

[3] *North Carolina Pesticide Report*, N.C. Department of Agriculture, Report No. 283, 1992, p. 8.

[4] See John H. Wilson, *et al.*, "North Carolina Pesticide Laws and Regulations," Pesticide Training Manual, N.C. Department of Agriculture and N.C. Agricultural Extension Service, 1989, p. 8. This quote does not apply to structural pest control applicators, which are regulated under legislation separate from other pesticide applicators.

[5] N.C.G.S. Chapter 143.

[6] See N.C.G.S. 143-468. North Carolina already charged registration fees of $30 per pesticide product. The new law imposes additional assessments of $25 per product for pesticides with sales less than $5,000 a year, and $50 per product for those with sales greater than $5,000 a year.

[7] N.C.G.S. 106-65.22-41.

[8] Legislative Research Commission, Committee on Pest Control, Report to the 1989 Session of the General Assembly, Dec. 14, 1988.

[9] The N.C. Department of Agriculture, in a news release dated June 2, 1994, stated that the Pesticide Board would accept nominations until July 11, 1994, for the following seats: three practicing farmers; one conservationist at large; one ecologist at large; one pesticide industry representative; one agribusiness representative; one local health director; one representative of a public utility or railroad company; one member of the N.C. Agricultural Aviation Association; one member of the public at large; and one person actively engaged in forest pest management. The board considered these nominations at its August 9, 1994, meeting—as this issue of *Insight* was going to press.

[10] N.C.G.S. 106-65.22.

[11] In 1992, the Pesticide Section tested 1,711 pesticide products. Those tests found seven products that were adulterated, 94 that were deficient, seven that had excessive active ingredients, and 36 that were not registered.

[12] To support his argument, Nimocks cites an article by Nan-Yao Su, *et al.*, "Measuring Termiticides," in *Pest Control*, September 1990, p. 24.

[13] The Center calculated violation rates by dividing the number of violation incidents in each applicator type by the number of applicators in that category and multiplying the result by 100. Violation incidents were defined as pesticide cases that culminated in hearings or settlement agreements through the Pesticide Board or the Structural Pest Control Committee.

[14] See David Pimentel, *et al.*, "Environmental and Economic Costs of Pesticide Use," *BioScience*, Vol. 42, No. 10 (November 1992), p. 755.

[15] For a discussion of the drifting potential of aerial sprays, see Pimentel, Note 14 above, p. 755.

[16] The Legislative Research Commission's Committee on Pest Control recommended such a change to the 1989 session of the N.C. General Assembly. Rep. Bertha Holt (D-Alamance) introduced a bill, H.B. 389, that would have widened the buffer zone to 300 feet, but the measure died in committee.

[17] From 1953 to 1971, aerial applicators were required to carry liability insurance under the N.C. Aerial Crop Dusting Law (G.S. 4B, Chapter 105), which was superseded by the N.C. Pesticide Law of 1971. Bill Buffaloe, state affairs manager for Rhone-Poulenc Ag Co. and former administrator of the state pesticide program, says the requirement was dropped because the cost of insurance premiums threatened to drive many aerial applicators out of business. "The cost was unreal," he says. "It really was a burden."

[18] The Pesticide Board reconsidered the case at its April 1994 meeting, directing its staff to negotiate a $2,000 settlement—the maximum fine for a single violation. However, the board's attorneys said that could be difficult because the golf-course owner, Thomas D. Wright of Wilmington, did not actually apply the pesticide himself. As a result, the board also directed its staff to draft legislation that would allow it to fine employers who order their workers to apply pesticides illegally. The General Assembly would have to approve the change.

IV.
How North Carolina Stacks Up Against Other States in the Regulation of Pesticides

by Tom Mather

One of the key questions guiding the Center's look at pesticide regulation was: How does North Carolina's pesticide program compare with those in other states? To answer that question, the Center sent a comprehensive survey to all 50 state pesticide programs. The survey found that North Carolina's program was among the most comprehensive in the breadth of its responsibilities and extent of its regulatory powers. North Carolina also ranked high in spending and staffing for pesticide programs, as well as in various measures of regulatory activity—including total fines assessed on violators, the number of applicator licenses suspended or revoked, and the number of complaints investigated. The survey also showed areas where the state was lagging, such as record-keeping requirements for pesticide applicators and the training needed for applicators to obtain and renew their licenses and certifications.

One of the primary goals of the Center's look at pesticide regulation was to assess how North Carolina's pesticide program compares with those in other states. A review of previous research sheds little light on the topic. Most studies of pesticide regulation have focused on federal legislation and its implementation by the U.S. Environmental Protection Agency (EPA). That's because the primary federal pesticide law, the Federal Insecticide, Fungicide, and Rodenticide Act, or FIFRA, authorizes the EPA to regulate pesticides and their uses.[1] Under FIFRA, the EPA is directed to register pesticide products, specify their proper uses, and remove unreasonably hazardous pesticides from the marketplace.

Despite the EPA's overriding authority, the federal agency has delegated to the states much of the responsibility for implementing pesticide laws and regulations. But only a few studies have examined the states' roles in regulating pesticide use, and most of those studies have been

Mark Wasmer, Farmworkers Legal Services of N.C.

conducted by environmental or public interest groups.[2]

The N.C. Center for Public Policy Research reviewed previous studies as part of its analysis of state pesticide programs. However, the Center decided to do original research in a new survey of state pesticide programs for several reasons: to assure the fairness, accuracy, and quality of the data; to obtain the most up-to-date information possible; to provide more in-depth information than afforded by previous studies; and to give state pesticide administrators an opportunity to review and comment on the results. The Center also assumed that state pesticide administrators would be most knowledgeable about the details of their programs.

Study Methodology

The Center prepared a draft survey of state pesticide programs in April 1993 based on interviews with pesticide authorities and consulting previous research on the topic. More than two dozen people reviewed our preliminary survey, and we incorporated many of their comments and suggestions. Those reviewers covered a wide spectrum of interests, including government regulators, researchers, farmers, agri-business representatives, environmentalists, farmworker advocates, and legislators.

A revised survey was mailed during July 1993 in a five-state test run that was used to fine tune the questions. The final survey included 42 questions in nine broad categories: general information; licensing and certification; record keeping; environmental concerns; farmworker safety and health; administration; regulatory authority; aerial application of pesticides; and miscellaneous information. We mailed the final survey in August 1993 to administrators of the lead pesticide programs in the remaining 45 states. A follow-up mailing was sent to states that had not responded by late September 1993.

The response was near complete, with surveys filled out by 45 states (90 percent)—representing every section of the country. By region, our response rate was: 100 percent from the Northeast, 94 percent from the South, 85 percent from the West, and 83 percent from the Midwest. States that did not respond to the survey were: Arkansas, Idaho, Illinois, Indiana, and New Mexico.

Some of the states that responded to the survey did not complete all of the questions. For example, six of the participating states didn't provide information on their budgets, and eight states didn't tell us the amount of fines they assess. Nevertheless, each question on the survey was answered by at least 36 states, and many questions by all 45 respondents.

The survey results are presented here in three ways: 50-state tables that list responses for each state; summary tables that consolidate answers from all of the respondents; and "Top-10" tables that rank states according to measurable criteria, such as the size of their budgets. In the Top-10 lists, states were ranked by total numbers as well as by amounts when adjusted for population and acres of harvested crops.[3] Rankings were adjusted to take into account the wide differences in population and agricultural activity among the states. For instance, California had the highest total pesticide budget among the survey respondents—which is not surprising since it is the nation's most populous state and a leading agricultural producer. However, North Dakota ranked first when pesticide budgets were divided by state populations, and Rhode Island ranked first when budgets were divided by state crop acreages. Populations and acres of harvested crops for each state were taken from 1990 data published by the U.S. Bureau of the Census.[4]

The Center's survey provides a comprehensive overview of state pesticide programs. Some of the highlights are listed in Table 12 on pp. 64–65, as well as the populations and acres of crops harvested for each state as reported in the 1990 U.S. Census.

Resources Available to Pesticide Programs

The average state pesticide program had a budget totaling nearly $2.7 million with 33 employees in fiscal year 1992–93, based on the 39 states that provided budget information in the Center's survey. (See Table 12 on pp. 64–65.) However, the resources available to pesticide programs vary widely, ranging from Nebraska's $85,000 budget and two-person staff[5] to California's $44-million budget and 372-person

—continues on page 66

◂ Farmworkers are among those most susceptible to potential harm from toxic pesticides. Yet the Center's survey found that less than one-fourth of the states had programs for educating farmworkers about pesticide safety.

Table 12. Highlights of Lead Pesticide Programs by State[1]

State	Type of Lead Pesticide Agency[2]	Total Budget, FY 92–93	Total Budgeted Staff, FY 92–93	Total Product Registration Fees[3]	Over-sight Board?[4]	Total State Population, 1990[5]	Acres of Crops Harvested 1990[6]
Alabama	Agriculture	NA	18	$870,000	No	4,041,000	2,342,000
Alaska	Environment	$307,000	4	0	No	550,000	NA
Arizona	Agriculture	$1,621,164	29	$180,000	No	3,665,000	802,000
Arkansas	Agriculture	NR	NR	NR	NR	2,351,000	8,080,000
California	Environment	$44,050,000	372	$2,054,000	No	29,760,000	4,797,000
Colorado	Agriculture	NA	NA	NA	No	3,294,000	5,862,000
Connecticut	Environment	$895,600	14	$499,080	No	3,287,000	129,000
Delaware	Agriculture	$450,167	8	$182,118	Yes	666,000	496,000
Florida	Agriculture	$5,877,858	121	$2,897,300	Yes	12,938,000	1,076,000
Georgia	Agriculture	$2,502,610	35	NA	Yes	6,478,000	3,793,000
Hawaii	Agriculture	$1,100,000	25	NA	Yes	1,108,000	79,000
Idaho	Agriculture	NR	NR	NR	NR	1,007,000	4,281,000
Illinois	Agriculture	NR	NR	NR	NR	11,431,000	22,759,000
Indiana	University	NR	NR	NR	NR	5,544,000	11,485,000
Iowa	Agriculture	$1,800,000	22	$1,600,000	Yes	2,777,000	23,276,000
Kansas	Agriculture	$1,196,296	25	$236,460	Yes	2,478,000	20,978,000
Kentucky	Agriculture	NA	37	NA	No	3,685,000	5,505,000
Louisiana	Agriculture	$2,579,274	4	$2,000,000	Yes	4,220,000	4,367,000
Maine	Agriculture	$773,685	12	$510,340	Yes	1,228,000	361,000
Maryland	Agriculture	$1,317,628	25	$619,940	Yes	4,781,000	1,552,000
Massachusetts	Agriculture	NA	13	$600,000	Yes	6,016,000	135,000
Michigan	Agriculture	$2,994,300	41	$855,300	No	9,295,000	6,510,000
Minnesota	Agriculture	$2,650,000	40	$3,300,000	No	4,375,000	18,779,000
Mississippi	Agriculture	$762,053	19	$366,050	Yes	2,573,000	4,723,000
Missouri	Agriculture	$547,720	17	$148,290	No	5,117,000	12,685,000
Montana	Agriculture	$1,360,850	32	NA	No	779,000	8,926,000
Nebraska[7]	Agriculture	$85,000	2	$68,500	Yes	1,578,000	18,044,000
Nevada	Agriculture	$500,000	5	$125,000	Yes	1,202,000	520,000
New Hampshire	Agriculture	$450,000	7	$260,000	Yes	1,109,000	91,000
New Jersey	Environment	$3,000,000	45	$2,180,000	No	7,730,000	364,000
New Mexico	Agriculture	NR	NR	NR	NR	1,515,000	881,000
New York	Environment	$2,850,000	51	$1,190,000	No	17,990,000	3,538,000
North Carolina	**Agriculture**	**$4,149,424**	**79**	**$371,730**	**Yes**	**6,629,000**	**4,370,000**
North Dakota	Agriculture	$1,141,483	8	$765,000	Yes	639,000	21,229,000
Ohio	Agriculture	$1,764,000	25	$580,000	Yes	10,847,000	10,132,000
Oklahoma	Agriculture	$1,069,085	20	$420,150	Yes	3,146,000	9,688,000
Oregon	Agriculture	NA	14	NA	No	2,842,000	2,290,000
Pennsylvania	Agriculture	$1,750,000	9	$1,057,000	Yes	11,882,000	4,094,000
Rhode Island	Agriculture	$270,000	5	$300,000	Yes	1,003,000	10,000

Table 12, *continued*

State	Type of Lead Pesticide Agency[2]	Total Budget, FY 92–93	Total Budgeted Staff, FY 92–93	Total Product Registration Fees[3]	Over-sight Board?[4]	Total State Population, 1990[5]	Acres of Crops Harvested 1990[6]
South Carolina	University	$1,580,000	34	NA	Yes	3,487,000	2,049,000
South Dakota	Agriculture	$593,116	8	$304,601	No	696,000	15,552,000
Tennessee	Agriculture	$998,398	30	$285,000	No	4,877,000	4,477,000
Texas[8]	Agriculture	$2,300,000	64	$1,070,000	No	16,987,000	18,550,000
Utah	Agriculture	NA	6	NA	Yes	1,723,000	992,000
Vermont	Agriculture	$512,000	8	$239,000	Yes	563,000	441,000
Virginia	Agriculture	$1,926,158	28	$838,817	Yes	6,187,000	2,726,000
Washington	Agriculture	$2,432,106	54	$570,863	Yes	4,867,000	4,168,000
West Virginia	Agriculture	$490,000	11	$156,000	No	1,793,000	668,000
Wisconsin	Agriculture	$4,346,969	20	$3,519,475	Yes	4,892,000	8,550,000
Wyoming	Agriculture	$100,000	2	0	Yes	454,000	1,735,000
Number of States Responding	(50)	39	44	37	45	(50)	(49)
Average Among Survey Respondents	—	$2,694,724	33	$862,973	—	—	—
Total Count	Agriculture 43 Environment 5 University 2	—	—	—	Yes 27 No 18	—	—

[1] Information based on responses to the N.C. Center for Public Policy Research's survey of state pesticide programs, except populations and crop acreages, which are based on U.S. Bureau of the Census data. NR = State did not respond to survey; NA = State did not answer question on survey.

[2] States responses when asked to describe the lead agency in which their pesticide programs are located. Lead pesticide agency for the five states that did not respond to survey was determined from: R. Steven Brown and Karen Marshall, *Resource Guide to State Environmental Management, Third Edition*, The Council of State Governments, Lexington, Ky., 1993.

[3] Total receipts of pesticide product registration fees in FY 1992–93.

[4] State responses to the question: Does your state have a lead board or commission that oversees your pesticide program?

[5] Populations as reported for 1990 by the U.S. Bureau of the Census, *Statistical Abstract of the United States: 1992* (112th edition), Washington, D.C., 1992, p. 22.

[6] *Ibid.*, p. 660.

[7] At the time of the Center's survey in August 1993, Nebraska's pesticide regulation was enforced by the U.S. Environmental Protection Agency. Since then, the Nebraska legislature has authorized the state's Department of Agriculture to regulate pesticides, with an initial annual budget of $750,000.

[8] Budget and staff figures for Texas are incomplete; they do not include money for inspections and enforcement.

—*continued from page 63*

staff. North Carolina has more resources than average, with a $4.1-million budget and 79 employees.

North Carolina also compares favorably when states are ranked according to the total size of their annual pesticide program budgets. (See Table 13 below.) The budget for North Carolina's pesticide program ranked fourth among the survey respondents, surpassed only by California, Florida, and Wisconsin. Other top-10 states in total budgets included New Jersey, Michigan, New York, Minnesota, Louisiana, and Georgia.

However, the top-10 rankings change considerably when annual budgets are adjusted for state populations or crop acreages. North Dakota, which spent $1.79 per person, was the top state when pesticide budgets were divided by 1990 populations. North Carolina tied with Maine for 10th place, with both states spending $0.63 per person on pesticide regulation. Other top-10 states in spending per population were: Montana, California, Hawaii, Vermont, Wisconsin, South Dakota, Delaware, and Iowa.

Not surprisingly, smaller states dominated the top-10 list when annual budgets were adjusted for crop acreages. Rhode Island, which spent $27 per acre, ranked first—followed by Hawaii, California, New Jersey, Connecticut, Florida, New Hampshire, Maine, Arizona, and Vermont. North Carolina, which spent $0.95 per acre, placed 12th among the survey respondents. California and North Carolina were the only two states to rank highly in total spending as well as spending adjusted for population and crop acreage.

States generally support their pesticide programs with funds from legislative allocations, federal grants, and pesticide-product registration

Table 13.
Leading State Pesticide Programs in Total Budgets, FY 1992–93

State	Total Budget, FY 1992-93	(Rank)[1]	Total Spending Adjusted for State Population	(Rank)[2]	Total Spending Adjusted for Crop Acreage	(Rank)[3]
California	$44,050,000	(1)	$1.48	(3)	$9.18	(3)
Florida	$5,877,858	(2)	$0.45	(17)	$5.46	(6)
Wisconsin	$4,346,969	(3)	$0.89	(6)	$0.51	(22)
North Carolina	**$4,149,424**	**(4)**	**$0.63**	**(10) tie**	**$0.95**	**(12)**
New Jersey	$3,000,000	(5)	$0.39	(22)	$8.24	(4)
Michigan	$2,994,300	(6)	$0.32	(25)	$0.46	(23)
New York	$2,850,300	(7)	$0.16	(35)	$0.81	(15)
Minnesota	$2,650,000	(8)	$0.61	(13)	$0.14	(29)
Louisiana	$2,579,274	(9)	$0.61	(12)	$0.59	(20)
Georgia	$2,502,610	(10)	$0.39	(23)	$0.66	(19)

[1] Information based on responses to the N.C. Center for Public Policy Research's survey of state pesticide programs. Rankings among 39 states that responded to this survey question.

[2] Total budget divided by state population as reported by the 1990 U.S. Census. Other top 10 states in spending by population were: North Dakota, $1.79 (1); Montana, $1.75 (2); Hawaii, $0.99 (4); Vermont, $0.91 (5); South Dakota, $0.85 (7); Delaware, $0.68 (8); Iowa, $0.65 (9); and Maine, $0.63 (10) tie.

[3] Total budget divided by statewide acres of harvested crops in 1990 as reported by the U.S. Bureau of the Census, *Statistical Abstract of the United States: 1992* (112th edition), Washington, D.C., 1992, p. 660. Other top 10 states in spending by crop acreage were: Rhode Island, $27.00 (1); Hawaii, $13.92 (2); Connecticut, $6.94 (5); New Hampshire, $4.95 (7); Maine, $2.14 (8); Arizona, $2.02 (9); and Vermont, $1.16 (10).

fees. The survey found that many states are collecting much more money from registration fees than North Carolina does. (See Table 14 on right.) Despite the size of its total budget, North Carolina collected only $371,730 in registration fees in FY 1992–93, ranking 22nd among the 37 states that answered that question. By comparison, the average state collected $862,973 in registration fees. Top-ranked Wisconsin—with nearly the same total annual budget as North Carolina—collected more than $3.5 million in registration fees. However, North Carolina's collections should increase substantially in FY 1993–94, as the General Assembly more than doubled the state's product registration fees, effective July 1, 1993.[6]

Pesticide Programs Vary in Administration and Responsibilities

One of the goals of the Center's survey was to characterize the "lead" pesticide agency in each state—that is, the primary agency authorized by the U.S. Environmental Protection Agency to enforce pesticide regulations. In North Carolina, the pesticide program is administered through the Department of Agriculture—and most states have similar setups. (See Table 12 on pp. 64–65 and Table 15 on p. 69.)

The Center's research found that, among the 50 state pesticide programs, 43 (86 percent) are located in agricultural agencies, five (10 percent) are located in environmental or natural resources agencies, and two (4 percent) are located in public universities. (The five states that did not respond to the survey were assigned to categories based on the names and addresses of their lead pesticide programs.) The regulation of pesticides by agricultural agencies has raised questions about potential conflicts of interests in North Carolina and other states.

"If nothing else, it's a perceptual problem—of the fox guarding the chicken house," says Mary Joan Pugh, a former member of the N.C. Pesticide Board. "They're trying to help farmers and at the same time make sure that the regulations are enforced. That's a very hard balance to strike." (The implications of agricultural agencies regulating pesticide use are discussed in more detail, starting on p. 83.)

The Center's survey also looked at the regulatory responsibilities of state pesticide programs, finding that most have a broad range of duties. (See Table 15 on p. 69 and Table 16 on pp. 72–73.) Virtually every state program is involved in: registration of pesticide products; regulation of pesticide use; structural pest control; adoption of regulations; and worker protection. More than half of the programs are involved in: education and training of pesticide users; quality control testing of products; pesticide disposal; monitoring of pollution and spills; and testing for pesticide residues in food. North Carolina is one of about 15 states (one-third of the respondents) with responsibilities in all of these areas.

Like North Carolina, a majority of the states surveyed (60 percent) have boards or commissions that oversee their pesticide programs. (See Table 12 on pp. 64–65 and Table 17 on p. 75.) However, few states have oversight boards with as many responsibilities and powers as in North Carolina. In many states, the oversight boards primarily serve as advisory panels to the pesticide programs. The make-up of these pesticide boards varies widely. More than half of the boards

Table 14.
Leading States in Total Pesticide Product Registration Fees Collected in Fiscal Year 1992–93

Rank[1]	State	Total Fees
1	Wisconsin	$3,519,475
2	Minnesota	$3,300,000
3	Florida	$2,897,300
4	New Jersey	$2,180,000
5	California	$2,054,000
6	Louisiana	$2,000,000
7	New York	$1,900,000
8	Iowa	$1,600,000
9	Texas	$1,070,000
10	Pennsylvania	$1,057,000
22	**North Carolina**	**$371,730**
AVERAGE (37 States)		$862,973

[1] Rank among 37 states that responded to question in the N.C. Center for Public Policy Research's survey of 50 states.

contain members representing farmers, universities, public health, agricultural agencies, environmental groups, and state environmental agencies. Most of the boards do not have members representing the chemical industry, consumer groups, and farmworkers. (For a detailed discussion of the make-up of North Carolina's pesticide oversight boards, see pp. 35–41 of the article, "Enforcement of Pesticide Regulations in North Carolina."[7])

Programs Dealing With Environmental Problems

Most states have programs dealing with specific environmental problems, such as groundwater contamination by pesticides. (See Table 18 on p. 76.) More than 90 percent of the states (including North Carolina) have programs for testing or monitoring groundwater—and most of those programs have detected pesticides in wells in their state.

Virtually all of the states surveyed (including North Carolina) also have established procedures for the public to report pesticide spills, accidents, or abuses. More than half of the states (including North Carolina) have programs for handling the disposal of unwanted pesticides and have banned or restricted the use of specific pesticides beyond federal requirements.

North Carolina is among 21 states (47 percent of the respondents) that restrict aerial applications of pesticides beyond the minimum requirements on product labels. For instance, North Carolina is among 16 states (36 percent of the respondents) that limit aerial deposits or drift within specified buffer zones around target sites. In addition, aerial applicators and industry representatives say that North Carolina is one of the few states that expressly prohibit *any* deposit or drift of pesticides in such buffer zones. "That is a really, really rigid standard," says Robert Fugitt, governmental affairs manager for DuPont chemical company in Wilmington, Del. "North Carolina has such a strict drift policy that it's very easy for a pilot to make a good application and still end up being cited for a violation."

However, North Carolina does not require pilots to notify nearby residents before spraying pesticides[8]—a measure required by one-third of the states. Aerial applicators generally oppose notification requirements because of potential delays and difficulties in tracking down nearby residents. "I can't go around and knock on everybody's house," says Wayne Slaughter, a Farmville pilot and past president of the N.C. Agricultural Aviation Association. "That would be economically impossible, and it would also prevent me from being on time.... A lot of my

North Carolina, like two-thirds of the states the Center surveyed, does not require aerial applicators to notify nearby residents before spraying pesticides on fields.

Karen Tam

Table 15.
Highlights of State Pesticide Programs

Question (Number of States Responding)[1]	**All States (Percent Yes)**	**North Carolina**
What category best describes the lead agency in which your pesticide program is located?[3] (50)		
Agriculture	86%	A,[2] B
Environment or Natural Resources	10%	
Public University	4%	
What areas of pesticide policy does your agency deal with? (45)		
Sales, distribution, and registration	100%	A
Pesticide application and use	98%	A, B
Adopting or revising regulations	98%	A, B
Structural pest control	93%	B
Worker protection	93%	A
Educating and training users	82%	A, B
Quality control testing of pesticide products	71%	A
Pesticide disposal	69%	A, B
Monitoring pesticide pollution and spills	64%	A, B
Testing for pesticide residues in food	51%	A
What regulatory powers does your agency have in dealing with those who violate pesticide regulations? (45)		
Suspending or revoking licenses	98%	A, B
Sending warning letters	98%	A, B
Levying fines or penalties	93%	A, B
Initiating criminal prosecutions	67%	A, B
Requiring cleanups	49%	A

[1] Number of states that answered this question in the N.C. Center for Public Policy Research's survey of state pesticide programs.

[2] Responses to survey questions by North Carolina's pesticide program. North Carolina's program is administered by two different agencies in the Department of Agriculture: A) the Pesticide Section of the Food and Drug Protection Division, which primarily regulates agricultural uses of pesticides, and B) the Structural Pest Control Division, which regulates exterminators.

[3] Type of lead agency for the five states that did not respond to the survey (Arkansas, Idaho, Illinois, Indiana, and New Mexico) was determined from R. Steven Brown and Karen Marshall, *Resource Guide to State Environmental Management, Third Edition*, The Council of State Governments, Lexington, Ky., 1993.

work comes in the day we do it—because that's the time it needs to be done. If we wait another day, these [insect] eggs will hatch."

Some states, like Connecticut, require aerial applicators to notify all nearby residents before any spraying. But most state notification requirements are not that stringent, instead requiring applicators to run newspaper ads before conducting large-scale spraying. Massachusetts takes a common-sense approach: it requires the posting of warning signs on application sites prior to spraying—a measure that officials say has substantially reduced complaints from nearby residents. "Any aerial spraying requires a sign," says Gail Kaprielian of the Massachusetts Pesticide Bureau. "[But] we're not telling farmers to go out and knock on everybody's doors."

Non-Agricultural Pesticide Users Prompt Most Complaints

Despite the prevalence of agricultural agencies in pesticide regulation, the Center's survey found that non-agricultural uses prompted many of the complaints about pesticide misuse. (See Table 19 on p. 77.) In fact, exterminators topped the list when pesticide administrators were asked to list the three categories of pesticide users that accounted for the most complaints in their states.

The top five user-groups in complaints generated were: exterminators (named by 76 percent of the survey respondents in 41 states), commercial applicators (61 percent), aerial applicators (46 percent), lawn care applicators (46 percent), and farmers (46 percent). Pesticide administrators reported few complaints regarding home gardeners, private utilities, producers and manufacturers, dealers, and public applicators.

The number of complaints prompted by non-agricultural users is not surprising given the large number of exterminators and lawn-care applicators that treat household and garden pests. Such users also are much more likely to apply pesticides in highly populated, urban areas than most agricultural applicators. "In our state, [violations] are heavily weighted toward the structural and non-agricultural types of applications," says John Orrok, enforcement chief in the New Jersey Pesticide Control Program. "I'm sure that more than 80 percent of our violations are non-agriculturally related."

North Carolina a Leader in Regulatory Powers and Fines

North Carolina is among those states that have the broadest range of powers for enforcing their pesticide regulations. (See Table 15 on p. 69 and Table 20 on pp. 78–79.) Virtually all of the states surveyed have the authority to send warning letters, suspend or revoke licenses, and assess fines and civil penalties. Two-thirds of the states can initiate criminal prosecutions of pesticide violators, and half of the states can require cleanups for spills and disposal problems. But only one-third of the states, including North Carolina, possess all of these powers.

A majority of states surveyed, however, can assess higher fines than North Carolina. Pesticide applicators in North Carolina can be fined as much as $2,000 per violation, except for private applicators, who can be fined up to $500 per violation. More than half the states surveyed (60 percent) can assess fines of $2,500 or more. Virginia has the authority to levy the highest fines—up to $120,000 per violation—and 10 other states reported maximum fines of $10,000 or more. Alaska reported that it could not assess fines, while Iowa, Nebraska, and Nevada have only recently acquired that authority.

The Center also asked pesticide administrators to report various measures of regulatory activity over a three-year span, 1990–92. (See Table 21 on pp. 80–81.) Three-fourths of the states (37) provided information on the amounts of fines they actually assessed and the numbers of licenses they suspended or revoked. Four-fifths of the states (40) provided information on the numbers of complaints they investigated.

Among the survey respondents, the average state fined 53 violators per year, totaling $44,998 annually. North Carolina was considerably higher than average, citing 101

"North Carolina has such a strict [pesticide] drift policy that it's very easy for a pilot to make a good application and still end up being cited for a violation."

—Robert Fugitt
Governmental Affairs Manager
DuPont Co., Wilmington, Del.

violators per year with fines totaling $60,658 annually. California fined the most number of violators, 881 per year, while New York assessed the most in total fines, $416,943 per year. North Carolina ranked seventh in the total amount of fines assessed per year. (See Table 22 on p. 83.) However, the state's ranking drops to 13th when adjusted for population, and 12th when adjusted for crop acreage.

> ***"Any aerial spraying requires a sign. [But] we're not telling farmers to go out and knock on everybody's doors."***
>
> —Gail Kaprielian
> Massachusetts Pesticide Bureau

Other top-10 states in total fines assessed per year included: California, Louisiana, Connecticut, New Jersey, Massachusetts, Tennessee, North Dakota, and Oklahoma. As with the budget rankings, the top-10 states change considerably when total fines are adjusted for populations and crop acreages. For instance, North Dakota ranked ninth in total fines, first in fines adjusted for population, and 24th in fines adjusted for crop acreage.

Despite the relatively large amount of total fines assessed in North Carolina, the *average amount per violator* was only $601—considerably lower than the average among all state respondents, $3,434. In two states, Connecticut and Massachusetts, the average fine was more than $40,000 per violator. Pesticide administrators in both states said their average fines were inflated by large penalties assessed against a few major violators. "We don't try to get money out of people until we file civil or criminal complaints," says Gail Kaprielian of the Massachusetts Pesticide Bureau. "So, when we get to the point of getting money out of people, it's for some really nasty stuff."

Suspensions and Revocations Little Used as Regulatory Tools

Although virtually all of the state pesticide programs (98 percent) can suspend or revoke applicator licenses and certifications, the Center's survey found that most states make little use of that authority. On average, the states suspended and revoked fewer than six licenses per year—and only seven states exceeded that average. In fact, more than half of the states surveyed (58 percent) suspended and revoked fewer than two licenses or certifications per year.

Pesticide administrators acknowledge that they try to use suspensions and revocations only as a last resort. "We're not the Gestapo," says John L. Smith, North Carolina's pesticide administrator. "In a lot of cases, if you take away that license, they're out of business completely." Even some states that assess large amounts of fines say they try to reserve suspensions only for serious, flagrant, and repeat violations. "It's very difficult to get to that point, to actually suspend or revoke a license," says Carmen Valentin of the New Jersey Pesticide Control Program. "We don't usually go that route unless people are really bad actors. We usually try to fine them first."

California led the states in the number of license suspensions and revocations, averaging 96 per year from 1990–92. (See Table 23 on p. 84.) North Carolina also was among the leading states, tying for fifth place with nearly 11 suspensions and revocations per year. Other top-10 states in total suspensions and revocations were: South Carolina, Washington, Colorado, Iowa, Texas, Mississippi, Connecticut, and Michigan. North Carolina drops to ninth place when the number of suspensions and revocations are adjusted for population and crop acreage. South Carolina ranks first when the numbers are adjusted for populations, and Connecticut ranks first when the numbers are adjusted for crop acreages.

Another way to gauge the level of regulatory activity in states is to look at the number of complaints investigated. On average, state pesticide programs investigated 290 complaints per year from 1990–92. California led the states in that regard, conducting 3,656 investigations per year. (See Table 24 on p. 89.) North Carolina placed second, investigating 927 complaints per year—more than three times higher than the average. Other top-10 states in investigations were: Oklahoma, New Jersey, Washington, Texas, Florida, Oregon, Ohio, and Michigan.

As with other measures of regulatory activity, the rankings change considerably when the numbers of investigations are adjusted for populations and crop acreages. Oklahoma placed first

—continues on page 74

Table 16.
Regulatory Responsibilities of Lead Pesticide Programs by State[1]

State	Sales, Distribution, Registration	Regulating Pesticide Use	Adopting Regulations	Structural Pest Control	Worker Protection
Alabama	Yes	Yes	Yes	Yes	Yes
Alaska	Yes	Yes	Yes	Yes	Yes
Arizona	Yes	Yes	Yes	No	Yes
Arkansas	NR	NR	NR	NR	NR
California	Yes	Yes	Yes	Yes	Yes
Colorado	Yes	Yes	Yes	Yes	No
Connecticut	Yes	Yes	Yes	Yes	Yes
Delaware	Yes	Yes	Yes	Yes	Yes
Florida	Yes	Yes	Yes	Yes	Yes
Georgia	Yes	Yes	Yes	Yes	Yes
Hawaii	Yes	Yes	Yes	Yes	Yes
Idaho	NR	NR	NR	NR	NR
Illinois	NR	NR	NR	NR	NR
Indiana	NR	NR	NR	NR	NR
Iowa	Yes	Yes	Yes	Yes	Yes
Kansas	Yes	Yes	Yes	Yes	Yes
Kentucky	Yes	Yes	Yes	Yes	Yes
Louisiana	Yes	Yes	Yes	Yes	Yes
Maine	Yes	Yes	Yes	Yes	Yes
Maryland	Yes	Yes	Yes	Yes	Yes
Massachusetts	Yes	Yes	Yes	Yes	Yes
Michigan	Yes	Yes	Yes	Yes	Yes
Minnesota	Yes	Yes	Yes	Yes	Yes
Mississippi	Yes	Yes	Yes	Yes	Yes
Missouri	Yes	Yes	Yes	Yes	Yes
Montana	Yes	Yes	Yes	Yes	Yes
Nebraska[2]	Yes	No	No	No	No
Nevada	Yes	Yes	Yes	Yes	Yes
New Hampshire	Yes	Yes	Yes	Yes	Yes
New Jersey	Yes	Yes	Yes	Yes	Yes
New Mexico	NR	NR	NR	NR	NR
New York	Yes	Yes	Yes	Yes	Yes
North Carolina	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
North Dakota	Yes	Yes	Yes	Yes	Yes
Ohio	Yes	Yes	Yes	Yes	Yes
Oklahoma	Yes	Yes	Yes	Yes	Yes
Oregon	Yes	Yes	Yes	Yes	No
Pennsylvania	Yes	Yes	Yes	Yes	Yes
Rhode Island	Yes	Yes	Yes	Yes	Yes
South Carolina	Yes	Yes	Yes	Yes	Yes
South Dakota	Yes	Yes	Yes	Yes	Yes
Tennessee	Yes	Yes	Yes	Yes	Yes
Texas	Yes	Yes	Yes	No	Yes
Utah	Yes	Yes	Yes	Yes	Yes
Vermont	Yes	Yes	Yes	Yes	Yes
Virginia	Yes	Yes	Yes	Yes	Yes
Washington	Yes	Yes	Yes	Yes	Yes
West Virginia	Yes	Yes	Yes	Yes	Yes
Wisconsin	Yes	Yes	Yes	Yes	Yes
Wyoming	Yes	Yes	Yes	Yes	Yes
Percent "Yes" Among Survey Respondents	100%	98%	98%	93%	93%

[1] Information based on the N.C. Center for Public Policy Research's survey of state pesticide programs. Table based on responses from 45 states that answered the survey question: What areas of pesticide policy does your agency deal with? NR = State did not respond to survey.

Table 16, *continued*

Educating, Training Users	Quality Control Testing	Pesticide Disposal	Monitoring Pollution and Spills	Testing Food for for Pesticide Residues	State
Yes	Yes	Yes	Yes	Yes	Alabama
Yes	No	Yes	No	No	Alaska
Yes	Yes	No	No	No	Arizona
NR	NR	NR	NR	NR	Arkansas
Yes	Yes	Yes	Yes	Yes	California
No	Yes	No	No	No	Colorado
No	Yes	No	No	No	Connecticut
Yes	Yes	Yes	Yes	Yes	Delaware
Yes	Yes	Yes	Yes	Yes	Florida
No	Yes	Yes	No	Yes	Georgia
Yes	Yes	Yes	Yes	No	Hawaii
NR	NR	NR	NR	NR	Idaho
NR	NR	NR	NR	NR	Illinois
NR	NR	NR	NR	NR	Indiana
Yes	Yes	Yes	Yes	No	Iowa
Yes	No	No	No	No	Kansas
No	No	No	No	No	Kentucky
Yes	Yes	Yes	Yes	Yes	Louisiana
Yes	No	No	Yes	No	Maine
Yes	Yes	Yes	Yes	Yes	Maryland
Yes	No	No	No	No	Massachusetts
No	Yes	Yes	Yes	Yes	Michigan
Yes	Yes	Yes	Yes	Yes	Minnesota
Yes	Yes	Yes	Yes	No	Mississippi
Yes	No	No	No	No	Missouri
Yes	Yes	Yes	Yes	Yes	Montana
No	Yes	No	No	No	Nebraska[2]
Yes	Yes	Yes	Yes	Yes	Nevada
Yes	No	No	No	No	New Hampshire
Yes	No	Yes	Yes	No	New Jersey
NR	NR	NR	NR	NR	New Mexico
Yes	Yes	Yes	Yes	No	New York
Yes	**Yes**	**Yes**	**Yes**	**Yes**	**North Carolina**
Yes	No	Yes	Yes	No	North Dakota
Yes	Yes	Yes	Yes	Yes	Ohio
Yes	Yes	Yes	Yes	Yes	Oklahoma
Yes	No	No	No	No	Oregon
Yes	No	Yes	Yes	Yes	Pennsylvania
No	No	No	Yes	No	Rhode Island
Yes	Yes	No	Yes	No	South Carolina
Yes	Yes	Yes	Yes	Yes	South Dakota
No	Yes	No	Yes	Yes	Tennessee
Yes	Yes	Yes	No	Yes	Texas
Yes	No	Yes	No	No	Utah
Yes	Yes	Yes	Yes	Yes	Vermont
Yes	Yes	Yes	Yes	Yes	Virginia
Yes	Yes	Yes	No	Yes	Washington
Yes	Yes	Yes	Yes	Yes	West Virginia
Yes	Yes	Yes	Yes	Yes	Wisconsin
Yes	Yes	Yes	No	No	Wyoming
82%	71%	69%	64%	51%	**Percent "Yes" Among Survey Respondents**

[2] When the N.C. Center conducted its survey in August 1993, Nebraska's pesticide regulation was enforced by the U.S. Environmental Protection Agency. Since then, the Nebraska legislature has authorized its Department of Agriculture to assume enforcement responsibilities. Thus, the state now has responsibility for regulating pesticide use, adopting regulations, and overseeing structural pest control and worker protection.

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in investigations per 1 million people, and Connecticut placed first in the number of investigations per 1 million acres of crops. North Carolina ranked third in investigations adjusted for population, and ninth when adjusted for crop acreages.

Training Programs Hard to Compare

The Center's survey also gathered information on pesticide education and training programs, which may be the most effective way to prevent the misuse of chemicals. (See Table 25 on p. 90.) North Carolina and most other states (84 percent) report that their licensing and certification requirements exceed the minimum federal standards. Virtually all of the states (98 percent) require applicators to pass written examinations demonstrating their knowledge of pesticide safety and use in order to obtain or renew their licenses and certifications. And, almost all states (98 percent) handle training programs through or in coordination with their cooperative extension services.

Educational requirements are hard to compare in more detail because the states categorize pesticide applicators so differently. For example, commercial applicators in some states include everything from aerial applicators to exterminators to lawn service firms. Other states, like North Carolina, have specific categories for many different types of applicators. States also vary widely

—*continues on page 77*

Betsy Small harvests cherry tomatoes at an organic farm in Chatham County.

Tom Mather

Table 17.
Oversight Boards for State Pesticide Programs

Question (Number of States Responding)[1]	**All States (Percent Yes)**[2]	**North Carolina**
Does the state have a board or commission that oversees its pesticide program? (45)	60%	A,[3] B
If the state has an oversight board, which of the following areas is it involved in? (27)		
Advising staff	81%	A, B
Adopting or revising regulations	67%	A, B
Setting policy	59%	A
Hearing contested cases and appeals	37%	A, B
Issuing or suspending licenses and permits	30%	A, B
Enforcing regulations	22%	A, B
Fining violators	22%	A, B
Allocating funds	15%	A
Which of the following groups are represented on state's oversight board? (25)		
Universities or colleges	72%	B
Farmers	68%	A
Agriculture industry	64%	A
Public health	64%	A, B
State agriculture agency	64%	A, B
Environmental or conservation groups	64%	A[4]
State environment, natural resources agency	60%	A
Chemical industry	44%	A
Consumer groups	12%	B
Farmworkers	8%	—
Other	64%	B

[1] Number of states that answered this question in the N.C. Center for Public Policy Research's survey of state pesticide programs.

[2] Percentage of "yes" responses among states that answered this survey question.

[3] Responses of "yes" to survey questions from North Carolina's pesticide program. Responses pertain to two panels: A) the N.C. Pesticide Board, which primarily regulates agricultural uses, and B) the N.C. Structural Pest Committee, which regulates exterminators. Responses do not include the N.C. Pesticide Advisory Committee, which advises the Pesticide Board on technical matters but has no regulatory authority.

[4] The N.C. Pesticide Law states that the Pesticide Board should contain a "non-governmental conservationist," but no member of the current board meets that qualification.

Table 18.
Summary of State Environmental Programs Dealing With Pesticides

Question (Number of States Responding)[1]	All States (Percent Yes)	North Carolina[2]
Does the state have a program for monitoring or testing groundwater for pesticide contamination? (45)	91%	Yes
Has that testing program detected any pesticides in your state's groundwater? (39)	90%	Yes
Has the state banned or restricted the use of any pesticides beyond federal requirements? (45)	60%	Yes
Does the state have procedures for the public to report pesticide spills, accidents, or abuses? (45)	91%	Yes
Does the state have a program for handling the disposal of outdated or unneeded pesticides? (45)	58%[3]	Yes
Does the state restrict aerial applicators of pesticides beyond the minimum requirements on product labels? (45)	47%	Yes
Does the state require pilots to notify people owning land or living near application sites before spraying pesticides? (45)	33%[4]	No[5]

[1] Number of states that answered this question in the N.C. Center for Public Policy Research's survey of state pesticide programs.

[2] Responses of "yes" to survey questions from the N.C. Department of Agriculture.

[3] Two states that answered "No" said they were developing pesticide disposal programs.

[4] Seven states that "sometimes" require notification are included with the states that answered "Yes" to this question.

[5] North Carolina requires notification in two limited circumstances: those seeking to spray in restricted areas, and those spraying within $^1/_2$-mile of registered apiaries (bee colonies).

—*continued from page 74*

in how often applicators must renew their certifications.

Nevertheless, the Center's survey of pesticide programs found that many states have more extensive educational requirements than North Carolina—particularly with regard to the hours of training that applicators need to renew their certifications. For example, the state of Washington requires all applicators to complete 40 hours of training every five years to renew their licenses or certifications. Colorado's requirements range from 36 hours for commercial applicators to 160 hours for exterminators, with a three-year renewal cycle. North Carolina has different training requirements for more than a dozen types of applicators, ranging from four hours every two years for aerial applicators to 10 hours every five years for horticultural applicators.

"Recertification [in North Carolina] is a total joke—it's like one evening every three years" for most private applicators, says Allen Spalt of the Agricultural Resources Center. Even some commercial applicators say that North Carolina should increase its training requirements for recertifica-

—*continues on page 82*

Table 19.
Leading Causes of Complaints to State Pesticide Agencies

Types of Pesticide Users	Number of State Programs that Cited User Group as a Leading Cause of Complaints[1]	Percent of Survey Respondents[2]	Weighted Score[3]
Exterminators	31	76%	72
Commercial applicators	25	61%	55
Aerial applicators (Crop dusters)	19	46%	40
Lawn care applicators	19	46%	37
Farmers	19	46%	31
Home gardeners	3	7%	6
Private utilities	3	7%	4
Producers, manufacturers	1	5%	2
Pesticide dealers	1	5%	1
Public operators	1	5%	1
Other	1	5%	2

[1] Information based on the N.C. Center for Public Policy Research's survey of state pesticide programs. The survey question asked pesticide administrators to indicate the three categories of pesticide users that prompted the most complaints about pesticide use in their states.

[2] Percent of the 41 states that answered this survey question.

[3] Pesticide user groups received 3 points for every survey in which they were ranked as the leading source of complaints, 2 points when ranked second, and 1 point when ranked third. The N.C. Pesticide Section, which primarily regulates agricultural uses, ranked problem users as follows: 1) commercial applicators, 2) farmers, 3) aerial applicators. The N.C. Structural Pest Control Division, which regulates exterminators, ranked problem users as follows: 1) exterminators, and 2) commercial applicators.

Table 20.
Regulatory Powers of Lead Pesticide Programs by State[1]

State	Suspend, Revoke Licenses	Send Warning Letters	Assess Fines, Civil Penalties	Initiate Criminal Prosecutions	Require Cleanups	Maximum Fine	Can Assess Higher Fines on Repeat Offenders
Alabama	Yes	Yes	Yes	No	No	$10,000	Yes
Alaska	Yes	Yes	No	Yes	Yes	0	NA
Arizona	Yes	Yes	Yes	No	No	$10,000	Yes
Arkansas	NR	NR	NR	NR	NR	NR	NR
California	Yes	Yes	Yes	Yes	No	$50,000	Yes
Colorado	Yes	Yes	Yes	No	Yes	$1,000	No
Connecticut	Yes	Yes	Yes	Yes	Yes	$5,000/day	No
Delaware	Yes	Yes	Yes	Yes	Yes	$2,500	Yes
Florida	Yes	Yes	Yes	No	No	$10,000	Yes
Georgia	Yes	Yes	Yes	No	Yes	NA	Yes
Hawaii	Yes	Yes	Yes	No	No	$5,000	Yes
Idaho	NR	NR	NR	NR	NR	NR	NR
Illinois	NR	NR	NR	NR	NR	NR	NR
Indiana	NR	NR	NR	NR	NR	NR	NR
Iowa	Yes	Yes	Yes	Yes	No	$500	No
Kansas	Yes	Yes	Yes	Yes	No	$5,000	No
Kentucky	Yes	Yes	Yes	Yes	No	NA	NA
Louisiana	Yes	Yes	Yes	No	Yes	$5,000	Yes
Maine	Yes	Yes	Yes	Yes	Yes	$4,000	Yes
Maryland	Yes	Yes	Yes	Yes	No	$5,000	Yes
Massachusetts	Yes	Yes	Yes	Yes	Yes	$25,000	No
Michigan	Yes	Yes	Yes	Yes	No	$25,000	No
Minnesota	Yes	Yes	Yes	Yes	Yes	NA	Yes
Mississippi	Yes	Yes	Yes	Yes	No	$25,000	Yes
Missouri	Yes	Yes	Yes	Yes	No	$1,000	Yes
Montana	Yes	Yes	Yes	No	Yes	$1,000	No
Nebraska[2]	No	No	No	No	No	0	NA
Nevada[3]	Yes	Yes	Yes	No	Yes	$5,000	Yes
New Hampshire	Yes	Yes	Yes	No	No	$1,000	Yes
New Jersey	Yes	Yes	Yes	Yes	Yes	$3,000	Yes
New Mexico	NR	NR	NR	NR	NR	NR	NR
New York	Yes	Yes	Yes	Yes	Yes	$10,000	Yes
North Carolina	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**$2,000**	**Yes**

Table 20, *continued*

State	Suspend, Revoke Licenses	Send Warning Letters	Assess Fines, Civil Penalties	Initiate Criminal Prosecutions	Require Cleanups	Maximum Fine	Can Assess Higher Fines on Repeat Offenders
North Dakota	Yes	Yes	Yes	No	Yes	$5,000	No
Ohio	Yes	Yes	Yes	Yes	Yes	$5,000	Yes
Oklahoma	Yes	Yes	Yes	Yes	Yes	$1,000	No
Oregon	Yes	Yes	Yes	Yes	Yes	$2,000	Yes
Pennsylvania	Yes	Yes	Yes	Yes	No	$10,000	Yes
Rhode Island	Yes	Yes	Yes	No	No	$10,000	Yes
South Carolina	Yes	Yes	Yes	Yes	No	$1,000	Yes
South Dakota	Yes	Yes	Yes	Yes	Yes	$5,000	No
Tennessee	Yes	Yes	Yes	Yes	Yes	$1,000	Yes
Texas	Yes	Yes	Yes	Yes	No	$2,000	Yes
Utah	Yes	Yes	Yes	No	No	NA	NA
Vermont	Yes	Yes	Yes	Yes	Yes	$1,000	No
Virginia	Yes	Yes	Yes	Yes	No	$120,000	Yes
Washington	Yes	Yes	Yes	No	No	$7,500	Yes
West Virginia	Yes	Yes	Yes	Yes	No	$1,000	Yes
Wisconsin	Yes	Yes	Yes	Yes	Yes	NA	Yes
Wyoming	Yes	Yes	No	Yes	No	$1,000	Yes
Number of States Responding	45	45	45	45	45	40	41.
Percent "Yes" Among Survey Responses	98%	98%	93%	67%	49%	—	71%

[1] Information based on the N.C. Center for Public Policy Research's survey of state pesticide programs. Table summarizes responses from 45 states to the following survey questions: (a) What authority does your agency have in dealing with those who violate pesticide regulations? (b) What is your maximum fine per violation? (c) Do you have the authority to levy higher fines on repeat violators? NR = State did not respond to survey; NA = State did not answer question on survey.

[2] When the Center conducted its survey in August 1993, Nebraska's pesticide regulation was enforced by the U.S. Environmental Protection Agency. Since then, the Nebraska legislature has authorized its Department of Agriculture to assume enforcement responsibilities. Therefore, the state now has authority to suspend and revoke licenses, send warning letters, assess fines and civil penalties, and initiate criminal prosecutions. Also, the state's maximum fine is now $15,000, but it cannot assess higher fines on repeat offenders.

[3] Nevada's pesticide program did not have the authority to assess fines until Oct. 1, 1993.

Table 21.
Fines, Suspensions, and Investigations by State Pesticide Programs, 1990–92[1]

State	Total Dollars in Fines Levied Per Year	(Rank)	Number of Fines Levied Per Year	Average Amount Per Fine	Licenses Suspended, Revoked Per Year	(Rank)	Complaints Investigated Per Year	(Rank)
Alabama	NA		NA	NA	0	(32 tie)	155.3	(18)
Alaska	0	(34 tie)	0	0	0	(32 tie)	7.7	(38)
Arizona	$6,596	(24)	61.7	$109	0.7	(21 tie)	171.3	(16)
Arkansas	NR		NR	NR	NR		NR	
California[2]	$387,300	(2)	881.0	$440	96.0	(1)	3,656.0	(1)
Colorado	$24,867	(12)	NA	NA	15.3	(4)	56.0	(34)
Connecticut	$116,417	(4)	2.7	$43,656	4.3	(9)	232.7	(15)
Delaware	$5,607	(26)	5.7	$989	0.7	(21 tie)	27.0	(37)
Florida[2,3]	$23,163	(14)	8.5	$2,725	0.3	(24 tie)	416.0	(7)
Georgia[3]	NA		1.0	NA	0	(32 tie)	83.0	(31)
Hawaii	$11,650	(20)	21.7	$538	0.3	(24 tie)	88.7	(29)
Idaho	NR		NR	NR	NR		NR	
Illinois	NR		NR	NR	NR		NR	
Indiana	NR		NR	NR	NR		NR	
Iowa[4]	0	(34 tie)	0	0	10.7	(5 tie)	143.3	(20)
Kansas	$7,667	(22)	12.7	$605	1.3	(16 tie)	136.7	(21)
Kentucky	NA		NA	NA	NA		NA	
Louisiana[3]	$153,833	(3)	23.0	$6,688	0.7	(21 tie)	263.7	(12)
Maine	$12,586	(19)	58.0	$217	0	(32 tie)	67.0	(32)
Maryland	$6,725	(23)	45.0	$149	2.0	(13 tie)	159.3	(17)
Massachusetts	$61,733	(6)	1.3	$46,300	2.7	(11)	61.0	(33)
Michigan	$1,450	(31)	3.7	$395	3.0	(10)	305.3	(10)
Minnesota	NA		NA	NA	0.3	(24 tie)	100.0	(28)
Mississippi	$6,500	(25)	7.7	$848	4.7	(8)	245.0	(13)
Missouri	$4,825	(27)	3.0	$1,608	0	(32 tie)	125.0	(23)
Montana	$3,350	(28)	18.0	$186	1.7	(15)	83.3	(30)
Nebraska[4]	0	(34 tie)	0	0	NA		NA	
Nevada[4]	0	(34 tie)	0	0	1.0	(18 tie)	NA	
New Hampshire	NA		NA	NA	NA		NA	
New Jersey	$106,479	(5)	172.0	$619	1.0	(18 tie)	503.0	(4)
New Mexico	NR		NR	NR	NR		NR	
New York	$416,943	(1)	93.0	$4,483	1.0	(18 tie)	147.7	(19)

Table 21, *continued*

State	Total Dollars in Fines Levied Per Year	(Rank)	Number of Fines Levied Per Year	Average Amount Per Fine	Licenses Suspended, Revoked Per Year	(Rank)	Complaints Investigated Per Year	(Rank)
North Carolina	**$60,658**	**(7)**	**101.0**	**$601**	**10.7**	**(5 tie)**	**927.0**	**(2)**
North Dakota	$35,528	(9)	79.7	$446	0.3	(24 tie)	51.0	(35)
Ohio	NA		NA	NA	NA		325.3	(9)
Oklahoma	$27,250	(10)	14.7	$1,858	0	(32 tie)	576.3	(3)
Oregon[2]	$22,000	(15)	28.0	$688	0.3	(24 tie)	345.7	(8)
Pennsylvania	$13,800	(18)	29.3	$470	0	(32 tie)	122.0	(25)
Rhode Island	$2,333	(30)	0.7	$3,500	0	(32 tie)	7.3	(39)
South Carolina	$26,490	(11)	60.0	$441	25.3	(2)	296.7	(11)
South Dakota	$11,324	(21)	36.3	$312	2.0	(13 tie)	105.0	(27)
Tennessee	$52,500	(8)	68.0	$772	2.3	(12)	132.7	(22)
Texas[3]	$23,942	(13)	16.0	$1,496	8.3	(7)	465.3	(6)
Utah	NA		NA	NA	NA		NA	
Vermont[2]	$2,633	(29)	5.0	$527	0.3	(24 tie)	44.5	(36)
Virginia	$13,905	(17)	17.0	$818	0		122.7	(24)
Washington	$14,147	(16)	34.7	$408	23.7	(3)	479.3	(5)
West Virginia	$217	(33)	1.0	$72	0.3	(24 tie)	117.3	(26)
Wisconsin	NA		NA	NA	1.3	(16 tie)	239.3	(14)
Wyoming	$500	(32)	1.0	$500	0.3	(24 tie)	5.3	(40)
Number of States Responding	37		36	36	40		40	
Average Among Survey Respondents	$44,998		53.1	$3,434	5.6		289.9	

[1] Information based on the N.C. Center for Public Policy Research's survey of state pesticide programs. Table based on state responses (for the years 1990–92) to the following survey questions: (a) How many fines did your agency assess in numbers and total dollar amounts? (b) How many licenses or certifications did you suspend or revoke? (c) In how many cases did your agency take any kind of regulatory action? NR = State did not respond to survey; NA = State did not answer this survey question.

[2] Data from California, Florida, Oregon, and Vermont are from 1991 and 1992 only.

[3] Data from Florida, Georgia, Louisiana, and Texas do not include structural pest control violations.

[4] Iowa, Nebraska, and Nevada could not assess fines on pesticide violators during the time period covered by this survey, but all three states now have that authority.

"Recertification [in North Carolina] is a total joke—it's like one evening every three years" for most private applicators.

—Allen Spalt, Director
Agricultural Resources Center

—*continued from page 77*

tions. "That I would agree with 100 percent," says Wayne Slaughter, the aerial applicator from Farmville. "If we've got a problem here, then let's go through education first and try to alleviate the problem before it occurs." Steve Taylor, owner of Capital Pest Services in Raleigh and past president of the pest control association, says: "I very strongly favor increased training requirements, and I think most structural pest control operators would agree."

But John H. Wilson, who coordinates North Carolina's pesticide training program for the Cooperative Extension Service, says it's misleading to compare states by just looking at the number of hours required for recertifications. North Carolina was the first state to develop training manuals for pesticide applicators, he says, and those materials have been used as models by EPA and many other states. "I think the quality of our training has probably been the best of any state in the U.S.," says Wilson, a professor of horticultural science at N.C. State University. "I don't think there's a state in the U.S. that hasn't gone to school using North Carolina training manuals. We had training manuals by 1974, when nobody else had any."

Another way to compare state training programs is to look at the range of topics they cover. (See Table 25 on p. 90.) Most of the states surveyed (including North Carolina) have classes covering: health and safety; first aid for pesticide poisonings; alternatives to pesticides; biological pest controls; integrated pest management; farmworker safety; and pollution prevention. However, only six states (not including North Carolina) provide training in organic farming—that is, methods of growing fruits and vegetables without the use of pesticides and chemical fertilizers. (See related articles concerning organic farming on pp. 92–94, farmworker safety on pp. 29–31, and integrated pest management on pp. 85–87.)

Perhaps most surprising was the finding that less than one-~~fourth~~ half of the states (~~24~~ 27 percent) had established programs for educating farmworkers about pesticide safety and use at the time of the survey (August 1993). This was surprising given that the EPA issued new protection standards for farmworkers and others who apply pesticides in 1992. The EPA's Worker Protection Standard initially was supposed to take effect April 1994, but Congress postponed many of the requirements until Jan. 1, 1995. Among its requirements, the standard mandates that employers train agricultural workers about pesticide safety and post bilingual signs summarizing basic information.[9]

The N.C. Pesticide Board adopted new farmworker protection regulations in 1993 that include training requirements.[10] But the board considered asking the EPA for a one-year delay in implementing the rules—until it heard testimony from a contingent of farmworkers at its November 1993 meeting. "We are never given any training in pesticides," Alfredo Vasquez, a migrant worker from Guatemala, told the board.[11] Other farmworkers told the board that they had gotten

"The quality of our training has probably been the best of any state in the U.S. I don't think there's a state in the U.S. that hasn't gone to school using North Carolina training manuals. We had training manuals by 1974, when nobody else had any."

—John H. Wilson, Pesticide Training Coordinator
N.C. Cooperative Extension Service

sick while picking crops, yet rarely received any warnings about recent pesticide applications. (See the accompanying story, "Farmworkers Seek Training About Pesticide Safety," on pp. 29–31, for more information about workers' concerns.)

The Pesticide Board had considered seeking the delay because of anticipated costs and a lack of EPA-approved training materials. "The board is concerned that the complexity of the regulation will make implementation by the state and compliance by agricultural employers difficult," the board wrote in a letter to the EPA. "Costs such as training equipment, increased employer liability, and reduced flexibility in farm operations will be real and significant."[12] Other state pesticide programs voiced similar concerns, which helped convince Congress to delay the rules.

Comparing Pesticide Programs Based in Agriculture Departments With Those in Environmental Agencies

Perhaps no issue in state pesticide regulation has caused more debate than the question: Can an agricultural agency regulate pesticides without favoring farmers at the expense of public health and the environment? Environmentalists generally answer "No" to that question. "There's an inherent conflict of interest for the pesticide program to be located in the agriculture department," says Allen Spalt of the Agricultural Resources Center, a Carrboro-based environmental group that focuses on agricultural issues. "This is not an agricultural problem; it's an environmental and human health problem."

Table 22.
Leading State Pesticide Programs in Fines Levied on Violators, 1990–92

State	Total Fines Per Year, 1990–92	(Rank)[1]	Average Amount Per Fine	(Rank)[2]	Annual Fines Per 1,000 People	(Rank)[3]	Annual Fines Per 1,000 Acres of Crops	(Rank)[4]
New York	$416,943	(1)	$4,483	(4)	$23.18	(4)	$117.78	(6)
California	387,300	(2)	440	(24)	13.01	(7)	80.74	(7)
Louisiana	153,833	(3)	6,688	(3)	36.45	(2)	35.20	(9)
Connecticut	116,417	(4)	43,656	(2)	35.42	(3)	895.52	(1)
New Jersey	106,479	(5)	619	(15)	13.77	(6)	295.78	(3)
Massachusetts	61,733	(6)	46,300	(1)	10.26	(11)	440.95	(2)
North Carolina	**60,658**	**(7)**	**601**	**(17)**	**9.15**	**(13)**	**13.88**	**(12)**
Tennessee	52,500	(8)	772	(13)	10.76	(9)	11.72	(14)
North Dakota	35,528	(9)	446	(22)	55.60	(1)	1.67	(24)
Oklahoma	27,250	(10)	1,858	(7)	8.66	(14)	2.81	(23)

[1] Information based on the N.C. Center for Public Policy Research's survey of state pesticide programs. Rank among the 37 states that responded to this survey question.

[2] Total dollars in fines divided by total number of fines. Other top 10 states in average fines were: Rhode Island, $3,500 (5); Florida, $2,725 (6); Missouri, $1,600 (8); Texas, $1,496 (9); and Delaware, $989 (10).

[3] Total fines per year divided by state population (in 1,000s) as reported in 1990 U.S. Census. Other top 10 states in fines by population were: South Dakota, $16.27 (5); Colorado, $11.32 (8); and Hawaii, $10.51 (10).

[4] Total annual fines divided by 1990 harvested cropland (in 1,000s of acres) as reported by the U.S. Bureau of the Census, *Statistical Abstract of the United States: 1992* (112th edition), Washington, D.C., 1992, p. 660. Other top 10 states in fines by crop acreage were: Rhode Island, $233.30 (4); Hawaii, $145.63 (5); Delaware, $46.33 (8); and Maine, $34.96 (10).

Table 23.
Leading State Pesticide Programs in Numbers of Applicator Licenses Suspended or Revoked, 1990–92

State	Number of Licenses Suspended or Revoked Per Year	(Rank)[1]	Suspensions and Revocations Per Million People	(Rank)[2]	Suspensions/Revocations Per 1 Million Acres of Crops	(Rank)[3]
California	96.0	(1)	3.32	(5)	20.00	(2)
South Carolina	25.3	(2)	7.27	(1)	12.36	(4)
Washington	23.7	(3)	4.86	(2)	5.68	(5)
Colorado	15.3	(4)	4.64	(3)	2.61	(8)
Iowa	10.7	(5) tie	3.85	(4)	0.46	(19)
North Carolina	**10.7**	**(5) tie**	**1.61**	**(9)**	**2.44**	**(9)**
Texas	8.3	(7)	1.47	(17)	0.45	(20)
Mississippi	4.7	(8)	1.83	(8)	0.99	(13)
Connecticut	4.3	(9)	1.31	(10)	33.31	(1)
Michigan	3.0	(10)	0.32	(21)	0.46	(18)

[1] Information based on the N.C. Center for Public Policy Research's survey of state pesticide programs. Average number among 37 state pesticide programs that responded to this survey question.

[2] Average number of suspensions and revocations per year divided by state population (in millions) from 1990 U.S. Census. Other top 10 states in suspensions by population were: South Dakota, 2.87 (6), and Montana, 2.18 (7).

[3] Average number of suspensions and revocations per year divided by state crop acreage (in millions) in 1990 as reported by the U.S. Bureau of the Census, *Statistical Abstract of the United States: 1992* (112th edition), Washington, D.C., 1992, p. 660. Other top 10 states in suspensions by crop acreage were: Massachusetts, 19.07 (3); Hawaii, 4.13 (6); New Jersey, 2.78 (7); and Nevada, 1.92 (10).

Agricultural interests generally disagree. "Following this logic, agencies that promote health would not be qualified to enforce health regulations either," says Anne Coan, natural resources director for the N.C. Farm Bureau Federation. "Instead I believe that there are dedicated state employees in the [N.C. Department of Agriculture] doing their duties as assigned to them by the General Assembly, whether or not some other part of their agency is involved in promoting agriculture." Proponents contend that agricultural agencies can regulate pesticides more effectively because of their knowledge of crops, pest problems, and pesticide use. Agricultural agencies also have existing relationships with farmers and other applicators through certification programs and cooperative extension services.

"The agricultural [pesticide] programs might be being run quite a bit more efficiently," Coan says. "They generally deal with these kinds of populations. So, therefore, they may have more access, more databases to draw on, and more personnel in the field."

North Carolina is not alone in this debate. As previously noted, the Center's survey found that most states (86 percent) regulate pesticides through their agriculture departments. And lawmakers in many of those states have considered moving their pesticide programs to health or environmental agencies.[13] "That's definitely been an issue in Washington [state], and it recurs every time the legislature convenes," says Ann Wick, program manager for the Washington Department of

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Farmers Go to School in Integrated Pest Management

GATESVILLE—Summer school is in progress on a misty morning in Gates County, but not at the local high school. The students are farmers, their classroom is a cotton field, and their teachers are agricultural extension agents.

The day's subject is entomology—the study of insects—and the farmers are learning how to identify the bugs that can damage their cotton crops. But, perhaps most significantly, the farmers are learning when *not* to spray their fields with pesticides. They're also learning how to recognize the beneficial insects that can control pests without chemicals.

"Contrary to what people might think, I don't think most farmers are out to destroy the environment," says one of the student-farmers, W.H. Lassiter of Sunbury. "We've got to live in it too. We use chemicals because we have to. Anytime I can cut back, I'd be glad to."

Lassiter is among a group of several dozen farmers taking a class in "Integrated Pest Management," or IPM, offered through the N.C. Cooperative Extension Service. IPM is a systematic approach to farming that seeks to reduce the use of pesticides and other agricultural chemicals.

Integrated Pest Management represents a middle ground between agri-chemical proponents who say that pesticides are nothing to

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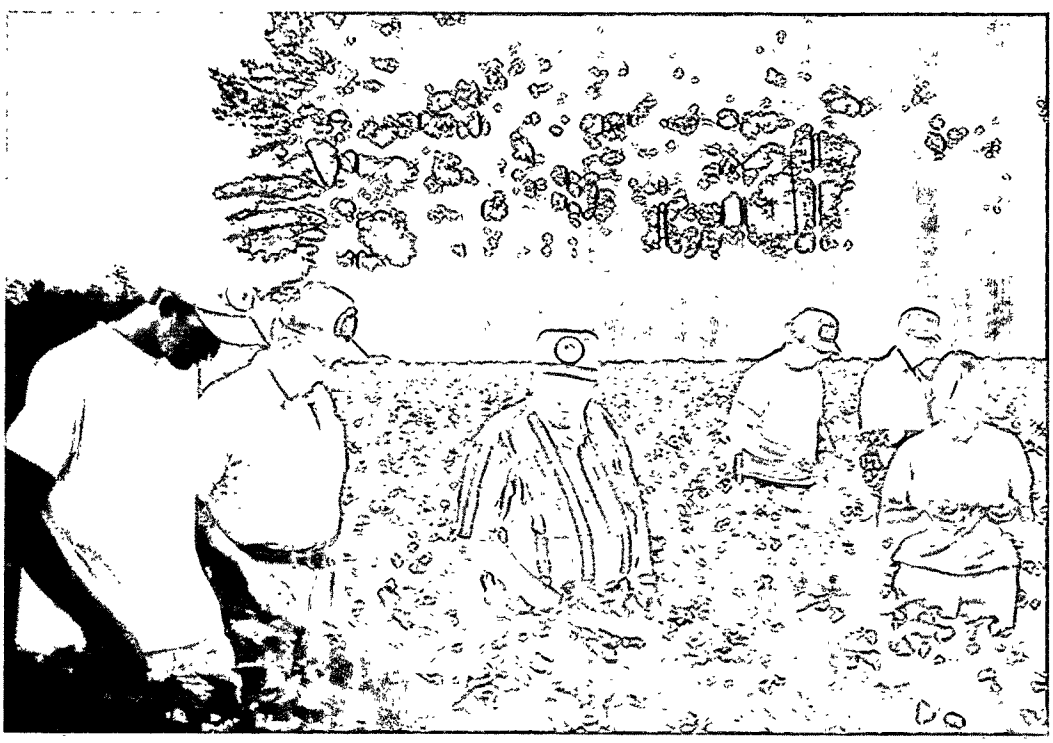
Farmers and extension agents "scout" a Gates County cotton field for insect pests.



Tom Marher

Farmers

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worry about and environmentalists who say such chemicals are too dangerous to use at all. Unlike organic farmers, IPM proponents don't shun the use of all pesticides and fertilizers. But IPM users recognize that cutting back on chemicals can save them money while posing fewer hazards to their health and the environment.

"I'm concerned about pesticide use—that's why I'm in integrated pest management," says Mike Linker, IPM coordinator for the N.C. Cooperative Extension Service. "But the thing about pesticides is that they're as close to a miracle for farmers as medicine was for doctors. And pesticides, in my opinion, ought to be used just like medicine. You don't use them just because it's Tuesday or because you've got a headache. You use them only when you get sick."

One of IPM's success stories is the cultivation of cotton. Virtually all of the state's cotton crop is now grown using IPM techniques—which have helped drastically reduce the amount of pesticide applications. In the early 1970s, Linker says, a typical cotton farmer would spray his crop a dozen or more times during the growing season. Now, he says, the typical cotton farmer sprays only two or three times—and some get by with no applications at all. In addition, today's pesticides are much more effective at killing insects, so that a farmer would typically apply only 2 ounces of chemical per acre—compared to 2 pounds per acre in the past.

The use of IPM techniques has helped contribute to an explosion in cotton production in North Carolina in recent years. Another vital factor has been the eradication of the boll weevil—the former nemesis of cotton growers—through an intensive insecticide spraying program in the late 1980s.

"I grew some cotton back in the early 1960s," says Lassiter, the farmer from Sunbury. "The boll weevil and the labor were the main reasons I stopped at the time. At that point, it just wasn't economical." Zackie Harrell, director of the Gates County extension service, says many other area farmers are growing cotton again because of the reduced need for spraying. "That's why we're seeing cotton coming back," he says. "The use of pesticides has been greatly, greatly reduced due to the eradication of the boll weevil. Most people in this county now don't spray but two or three times the whole year."

Integrated Pest Management is actually a collective term for a variety of production methods specific to different crops. Such methods include a number of age-old farming techniques, such as cultivating fields, rotating crops, and timing the planting of seeds to avoid the hatchings of serious pests. IPM also makes use of newer techniques, such as releasing insects that naturally prey on pests. For example, ladybugs can be used to control aphids—one of the most serious insect pests for many crops.

One of the key IPM techniques is "scouting," that is, learning how to recognize harmful and beneficial insects in the field. The farmers in Gates County are learning how to

"The thing about pesticides is that they're as close to a miracle for farmers as medicine was for doctors. And pesticides, in my opinion, ought to be used just like medicine. You don't use them just because it's Tuesday or because you've got a headache. You use them only when you get sick."

—Mike Linker, IPM coordinator, N.C. Cooperative Extension Service

Two critically important facts have been overlooked in designing the modern insect control programs. The first is that the really effective control of insects is that applied by nature, not by man. ... The second neglected fact is the truly explosive power of a species to reproduce once the resistance of the environment has been weakened.

—RACHEL CARSON, *SILENT SPRING*

scout for a particular kind of moth and its eggs, which will hatch into caterpillars called boll worms.

"The boll worm is the No. 1 cotton pest in this area," says Marjorie Rayburn, an IPM specialist with the extension service in Edenton. "What we're trying to do is teach the farmers to recognize the worm in its early stages." The key to scouting, she says, is determining whether the number of moth eggs is large enough to warrant spraying. In cotton, that so-called economic threshold occurs when farmers find eggs on more than 10 percent of the plants they check in their fields. Below that level, the cost of spraying would be higher than the damage likely to result from worms. Above that level, the worms could devastate a crop if not sprayed.

"With treatments based on scouting reports, you're not treating unless you absolutely have to," Rayburn says. "What we don't want to do is go out into the field and find a whole bunch of chunky, long worms eating up the cotton. They're harder to treat, it takes a lot more pesticide to kill them, and they've already done a whole lot of damage by that point."

Reginald Askew, a farmer from Eure, says that scouting and other IPM techniques have dramatically reduced the amount of insecticides he sprays on his cotton fields. "We don't use what you call the shotgun approach anymore," Askew says. "We treat a field only if it needs it. When you find an egg threshold, you spray. Then five days later, you spray again. If we could figure out a way to get rid of the boll worm, virtually all of the need for spraying would be gone."

—*Tom Mather*

Tom Mather

John Van Duyn, an entomology professor with N.C. State University, shows farmers how to spot boll worms, one of the most serious cotton pests.

"Our job is to protect the environment as much as possible. We're more like cops. The agriculture people want the best bug-killer out there that will get a crop ready for harvest."

—James Moran, Chief
New York Bureau of Pesticide Regulation

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Agriculture's Pest Management Division. California, which has the largest state budget for pesticide regulation, moved its program from the Department of Agriculture to the Environmental Protection Agency in the 1991–92 fiscal year.

The Center's survey results suggest that other state legislatures ought to consider the issue. The survey found substantial differences when states with agriculture-based pesticide programs were compared with environmental and university-based programs. (See Table 26 on p. 91.) On average, the environmental-based programs had much larger budgets and staffs. The environmental programs also had a higher level of regulatory activity. That is, they levied more fines, suspended or revoked more licenses, and investigated more complaints. Such trends held up even when the numbers were adjusted for the populations and crop acreages of states.

However, the interpretation of these differences depends on one's philosophical assumptions. A person who believes that higher levels of regulatory activity indicate more problem-solving would say that pesticide programs are better when based in environmental agencies. But others might contend that better training occurs in agricultural agencies, thus leading to a lower level of regulatory activity. In their eyes, more regulation is worse, not better. "If you're a farmer, you would say, 'We don't want to go that way,'" says Jerry Coker, chairman of the N.C. Pesticide Board. "But if you're an environmentalist, you might say, 'They're really nailing the violators.'"

Administrators in states with environmental-based pesticide programs say they aren't surprised by the results. "Our job is to protect the environment as much as possible," says James Moran, chief of the New York Bureau of Pesticide Regulation. "We're more like cops. The agriculture people want the best bug-killer out there that will get a crop ready for harvest." Others cite potential conflicts of interest in agricultural agencies simultaneously promoting and regulating pesticide use. "If we were in the same program, how could we regulate them and also encourage them?" says Carmen Valentin of the New Jersey Pesticide Control Program. "We feel that it's a conflict of interest. It wouldn't serve the public for us to be in agriculture."

Administrators of agriculture-based programs say several factors could account for the discrepancies. "That doesn't surprise me at all," says Wick of the Pesticide Management Division in Washington state. "We have seen that the environmental agencies have much higher fines and penalties." Other agricultural administrators suggest that environmental programs aren't doing as good a job educating pesticide applicators—thus leading to more violations. "California has a tremendous reputation based on regulation," says John H. Wilson, the coordinator of North Carolina's pesticide training program. "Everybody thinks California walks on water. But when it comes to training, they're no better than a lot of states."

Pesticide administrators in California and other states with programs in environmental agencies, however, bristle at suggestions that they are not educating applicators as well as agricultural agencies. "We're pretty aggressive with both education and enforcement," says John Orrok, enforcement chief in the New Jersey Pesticide Control Program. "By aggressive, I don't mean

"The basic premise is that we don't act against agricultural people, when in fact we do. All you have to do is look at our case files. You will see farmers, commercial applicators, corporate giants—all where we've taken actions against them."

—John L. Smith, Pesticide Administrator
N.C. Department of Agriculture

Table 24.
Leading State Pesticide Programs in Numbers of Complaints Investigated, 1990–92

State	Number of Cases Investigated Per Year	(Rank)[1]	Investigations Per 1 Million People	(Rank)[2]	Investigations Per 1 Million Acres of Crops	(Rank)[3]
California	3,656.0	(1)	122.8	(4)	762.1	(4)
North Carolina	**927.0**	**(2)**	**139.8**	**(3)**	**212.1**	**(9)**
Oklahoma	576.3	(3)	183.2	(1)	59.4	(19)
New Jersey	503.0	(4)	65.1	(15)	1,381.9	(2)
Washington	479.3	(5)	98.5	(7)	115.0	(14)
Texas	465.3	(6)	27.4	(28)	25.1	(29)
Florida	416.0	(7)	32.1	(26)	386.6	(7)
Oregon	345.7	(8)	121.6	(5)	151.0	(12)
Ohio	325.3	(9)	30.0	(27)	32.1	(25)
Michigan	305.3	(10)	32.8	(25)	46.9	(22)

[1] Information based on the N.C. Center for Public Policy Research's survey of state pesticide programs. Average number of complaints investigated per year, 1990–92, among 40 state pesticide programs that responded to this survey question. Data available for the years 1991 and 1992 only from California, Georgia, and Vermont; available for 1992 only from Maine. Data from Florida, Georgia, Louisiana, and Texas do not include structural pest investigations.

[2] Number of cases investigated per year divided by state population (in millions) from 1990 U.S. Census. Other top 10 states in investigations by population were: South Dakota, 150.8 (2); Montana, 106.9 (6); Mississippi, 95.2 (8); South Carolina, 85.1 (9); and Hawaii, 80.1 (10).

[3] Average number of cases investigated per year divided by acres of crops harvested (in millions) as reported by the U.S. Bureau of the Census, *Statistical Abstract of the United States: 1992* (112th edition), Washington, D.C., 1992, p. 660. Other top 10 states in investigations by crop acreage were: Connecticut, 1,803.9 (1); Hawaii, 1,122.8 (3); Rhode Island, 730.0 (5); Massachusetts, 451.9 (6); Arizona, 213.6 (8); and Maine, 185.6 (10).

unfair. I think we do the education, but we have the enforcement backing for violators when we need it." Also, virtually all states (including North Carolina) train pesticide applicators through their cooperative extension services—regardless of whether they regulate pesticides through an agriculture or environment agency. "Moving administrative responsibilities for the pesticide programs to the environment department would not necessarily have any effect on the education programs," says Erick Umstead, research director for the Agricultural Resources Center in Carrboro.

North Carolina's Program More Active Than Most

North Carolina's pesticide program, however, is clearly not a laggard compared to other states. North Carolina is among the leaders in spending and staffing as well as the numbers of fines, suspensions, and complaints investigated. Its regulatory responsibilities and powers are among the broadest of the states surveyed.

"I don't think you could point a finger at North Carolina," says Von McCaskill, head of

South Carolina's pesticide program, which is based at Clemson University. "I am very familiar with that program, and I think they do a very good job." That view is seconded by Robert Fugitt, governmental affairs manager for DuPont chemical company in Wilmington, Del. "North Carolina has a good program," Fugitt says. "There are a lot of states that have taken a pretty laissez-faire attitude toward agriculture. We deal with all of the states. And North Carolina is one of the states we pay a lot of attention to—because they're strict and they're rigid."

Nevertheless, states with pesticide programs based in environmental agencies were higher on average than North Carolina in virtually every category—budgets, staffs, fines, and suspensions. North Carolina was higher than the states with

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Table 25.
Summary of State Training Programs for Pesticide Users

Question (Number of States Responding)[1]	**All States (Percent Yes)**	**North Carolina[2]**
Does the state license or certify pesticide users beyond the minimum federal requirements? (44)[3]	84%	Yes
Does the state require that pesticide users pass written examinations showing knowledge of pesticide safety and use to obtain or renew licenses or certifications? (45)	98%	Yes
Does the state have a pesticide education program *aimed at* farmworkers? (45)	47% ~~24%~~	Yes
Which topics does the state pesticide applicator training or education program include? (44)		
Health and safety issues	98%	Yes
Integrated pest management	98%	Yes
Farmworker safety	95%	Yes
First aid for pesticide poisonings	91%	Yes
Pollution prevention	89%	Yes
Alternatives to chemical pesticides	80%	Yes
Biological pest controls	70%	Yes
Organic farming	14%	No

[1] Number of states that answered this question in the N.C. Center for Public Policy Research's survey of state pesticide programs.

[2] Responses of "yes" to survey questions from the N.C. Department of Agriculture.

[3] The U.S. Environmental Protection Agency sets minimum certification requirements for applicators of restricted-use pesticides as specified by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. Part 136v.

Table 26.
Comparison of Pesticide Programs Based in Agricultural Agencies with Those Based in Environmental Agencies or Universities

Criteria[1] (Number of States Responding)[3]	Type of Lead Agency[2]		North Carolina[4]
	Agriculture	Environment	
Percent of States by Type (45)	86.7%	13.3%	(Agriculture)
Population (45)	4,190,513	10,467,333	6,629,000
Crop Acreage (44)	6,424,974	2,175,400	4,370,000
Number of Staff (44)	24	87	79
Total Pesticide Budget (39)	$1,588,223	$8,780,483	$4,149,424
Adjusted for Population	$0.37	$0.84	$0.63
Adjusted for Crop Acreage	$0.22	$4.82	$0.95
Total Fines Assessed Per Year (37)	$19,719	$175,605	$60,658
Adjusted for Population	$4.84	$16.78	$9.15
Adjusted for Crop Acreage	$3.05	$96.87	$13.88
Average Fine (36)	$835	$872	$601
Suspensions/Revocations Per Year (40)	2.8	21.3	10.7
Adjusted for Population	0.7	2.0	1.6
Adjusted for Crop Acreage	0.4	11.7	2.4
Complaints Investigated Per Year (40)	211.2	807.3	927.0
Adjusted for Population	46.6	77.1	139.8
Adjusted for Crop Acreage	31.9	445.3	212.1

[1] For a more complete description of criteria and sources of information, see Table 10 for population, crop acreage, total budget, and number of budgeted staff by state. See Table 19 for more detailed information on fines, suspensions and revocations, and regulatory actions. For descriptions of how budgets, fines, suspensions/revocations, and regulatory actions were adjusted for population and crop acreage, see Tables 11, 20, 21, and 22.

[2] Numbers are averages among states that responded to questions on survey. Environment category includes states with lead pesticide programs in environment, conservation, or natural resources agencies, and public universities. For lead agencies by individual states, see Table 10.

[3] Number of states that responded to this question in the N.C. Center for Public Policy Research's survey of state pesticide programs.

[4] Based on survey responses from the N.C. Department of Agriculture.

Physician-Farmer Aims to Heal the Land

PITTSBORO—Fifteen years ago, Bill Dow moved to North Carolina to teach and practice medicine at the University of North Carolina at Chapel Hill. Now he's growing herbs and vegetables for a living on his 22-acre farm in Chatham County. But Dow hasn't forgotten his medical training while pursuing his new trade. Instead of conventional agriculture, the retired physician farms "organically"—that is, without using pesticides and chemical fertilizers.

"I'm doing this because it's the right thing to do," Dow says. "We spray food with stuff that intentionally kills insects, and yet we have not demanded enough information to make sure it doesn't hurt us. The problem is: You can see a caterpillar, but you can't see what somebody sprayed on your food. Unfortunately, people think what you can't see ain't there. In the future, I think people will look back at [pesticide users] and say, 'What was the matter with them? Weren't they thinking?'"

The main reason Dow shuns pesticides is that he's not convinced researchers have studied them enough to assure that they don't cause health and environmental problems. "Most of the chemicals on the market don't have that [testing]," he says. "It may be that they are all fine. But if I handed you a gun with one bullet in it, would you fire it at your head? And that's what we're doing with pesticides. . . . Pharmaceuticals are required to be tested intensely before we allow people to ingest them. I think no less should be done for the chemicals we put on food."

"The real value of the farm is the soil. As far as pesticides and fertilizer are concerned, we just don't need them."

—Bill Dow of Pittsboro
Organic farmer and physician

Despite his medical background, Dow is no stranger to conventional agriculture. He grew up on a farm outside Meridian, Miss., where his father grew soybeans and raised cattle. "I used to go home during school, when it was time to plant and harvest," he says. "One day I told my family, 'I'll do anything else but spray the herbicides.' I wasn't comfortable with them—the pollution, getting into the groundwater. They just couldn't handle that."

Most farmers dismiss organic farming, he says, because they think you can't make money at it. But Dow says he makes a comfortable living—even though he actively cultivates only about two acres of his farm. "If I had 10,000 acres of corn, I'd probably be losing money," he says. "But we're making a good income. We're busy from the first of March through Christmas time."

The secret to Dow's success, he says, is diversification. He grows a wide variety of herbs, fruits, and vegetables—carefully chosen for their marketability. Such crops yield a high value per acre because they are in strong demand by nearby restaurants, consumers, and grocery markets. "I talk to the chefs in restaurants and ask them, 'What is it that you need that you can't get?' Then I'll try it out. There's been a lot of things I've learned from the chefs. So, it's been very rewarding."

In the spring and fall, Dow grows cool-weather crops like broccoli, cauliflower, asparagus, and a range of cabbage and lettuce varieties. In summer, he focuses on hard-to-

Tom Mather

Bill Dow, organic farmer and physician from Chatham County.

find varieties of tomatoes and peppers—such as the large red and yellow sweet peppers that command top dollar in grocery stores. He also grows an assortment of fresh herbs, including sage, fennel, oregano, mint, tarragon, thyme, rosemary, dill, and Italian parsley. His other crops include blueberries and fresh cut flowers.

"If you asked me five years ago if I'd ever grow cut flowers, I'd say you were crazy," he says. "But they're selling just great. You won't make it on one crop. You need to grow a lot of different things. Every summer I lose at least one crop. But I make up for it with other things. When you grow all of one crop, you end up selling it for not as much—because there's a lot of it on the market."

The diversity of crops also helps discourage pest problems. Other ways Dow avoids pests include mulching, rotating crops, and regular cultivation and weeding. Plus, he says his fields have a good supply of natural predators—such as certain kinds of wasps that feed on tomato worms—because he doesn't douse his crops with insecticides. He fertilizes crops with manure, compost, lime, and bone meal.

"The real value of the farm is the soil," he says. "As far as pesticides and fertilizer are concerned, we just don't need them. . . . If we need a pesticide, it's for deer. We probably lose $2,000 a year in crops to deer."

Another factor that has helped Dow is that he sells his produce directly to his customers—who include more than 20 restaurant operators in Pittsboro, Durham, and Chapel Hill. "The problem with a lot of farmers is they say, 'My job is to grow it, not sell it.' But they're hardly making any money growing it, and the guy in the middle is making all the money. A lot of farmers are going out of business. They should try something new before they decide to quit. There's a lot

—continues

"We spray food with stuff that intentionally kills insects, and yet we have not demanded enough information to make sure it doesn't hurt us. The problem is: You can see a caterpillar, but you can't see what somebody sprayed on your food. Unfortunately, people think what you can't see ain't there."

—BILL DOW OF PITTSBORO, ORGANIC FARMER AND PHYSICIAN

Physician-Farmer

—continued from previous page

of folks doing what I do, and they're making it. I can't speak for anyone else, but we're doing fine."

North Carolina has an estimated 500 organic farmers, according to the Agricultural Resources Center, a Carrboro-based environmental group that promotes alternative farming methods. The growing interest in organic farming has even prompted action by the N.C. Department of Agriculture. In February, Agriculture Commissioner Jim Graham announced the opening of a 2,300-acre experimental farm near Goldsboro that will be used to conduct research on organic farming and other kinds of "sustainable" agricultural techniques.[1]

But, for evidence that organic techniques can work, one only needs to look at the produce that Dow grows on his farm. His tomato vines bend from the weight of lush, red fruits. His pepper plants are laden with huge, shiny orange and yellow pods. The fragrant herbs can be smelled just walking through the orderly rows of crops.

"The bottom line for most people is, 'What does it look and taste like?'" Dow says. "We can compete with the best of them."

—Tom Mather

FOOTNOTE

[1] The Department of Agriculture's experimental farm is called The Center for Environmental Systems. The department is operating the farm in partnership with the College of Agriculture and Life Sciences at N.C. State University and the School of Agriculture at A&T State University. For more details, see Martha Quillin, "Pesticides no longer the pick at Cherry Farm," *The News & Observer* (Raleigh, N.C.), Feb. 2, 1994, p. 3A.

—continued from page 90

pesticide programs based in environmental agencies in only one category, the number of complaints investigated.

Spalt, of the Agricultural Resources Center, says the survey clearly shows that the N.C. General Assembly should move pesticide regulation from the Department of Agriculture to the Department of Environment, Health, and Natural Resources. "The data shows that if a pesticide program is in an environmental agency, the fines will be much higher," Spalt says. "Even in the areas where North Carolina's numbers look good, they're less than half what they are in the environmental states."

But state agricultural officials say the survey results show they are doing a good job of balancing agricultural interests with health and environmental concerns. "The basic premise is that we don't act against agricultural people, when in fact we do," says Pesticide Administrator John Smith. "All you have to do is look at our case files. You will see farmers, commercial applicators, corporate giants—all where we've taken actions against them. But we don't have a police state. Our efforts are to educate, to try to get them to do it the right way. And then we use the regulatory system to ensure compliance.... We've got a strong commitment within this department to carry this program out."

Others say it's a mistake to assume that states with larger budgets or higher numbers of enforcement actions are doing a better job of protecting health or the environment. "That [survey] doesn't measure whether the environment is really better or not," says Jerry Coker, the N.C. Pesticide Board's chair. "That's still an unanswered question. The real bottom line you never know is which states are getting the best environmental protection for the money."

(Center intern Kevin Scott provided research assistance for this article.)

FOOTNOTES

[1] The Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 *et seq.*) delegates to the EPA further regulatory authorities, primarily relating to the amounts of pesticide residues allowed on foods.

[2] Previous studies that examine various aspects of pesticide regulation by state include:

The National Center for Policy Alternatives, a Washington-based research group, has published several reports highlighting model pesticide programs in selected states and recommending general policy improvements. See Anne Hoskins and Jeffrey Tryens, *The Harvest: State Strategies for Sustainable Agriculture*, 1990; and Tani Adams and J. Tryens, *The Pesticides Crisis: A Blueprint for States*, 1988. Both publications are available from the National Center for Policy Alternatives, 1875 Connecticut Ave., NW, Washington, D.C., 20009. Phone: (202) 387-6030.

The National Coalition Against the Misuse of Pesticides, a Washington-based environmental group, has compiled a collection of state laws and local pesticide ordinances. See, "State and Local Pesticide Ordinances," National Coalition Against the Misuse of Pesticides, 701 E St. SE, Washington, D.C., 20003. Phone: (202) 543-5450.

Renew America, a Washington-based public interest group, has published reports that rank states on various environmental factors and policy measures, including pesticide regulation. See Scott Ridley, "The State of the States," 1988 and 1989, Renew America, 1001 Connecticut Ave. NW, Suite 719, Washington, DC, 20036. Phone: (202) 466-6880.

The Institute for Southern Studies, a public interest group based in Durham, N.C., has published a book that ranks states on numerous environmental factors, including several measures of pesticide use and regulation. See Bob Hall and Mary Lee Kerr, *1991–92 Green Index*, Island Press, Suite 300, 1718 Connecticut Ave., NW, Washington, D.C., 2009.

The Council of State Governments, a Lexington, Ky., based organization that researches state government policies, publishes a guide to state environmental management that includes information on budgets and the administration of pesticide programs. See R. Steven Brown and Karen Marshall, *Resource Guide to State Environmental Management*, 1993, The Council of State Governments, 3560 Iron Works Pike, Lexington, Ky., 40578. Phone: (800) 800-1910.

[3] The Center chose population and acres of harvested crops to adjust its numbers because data were readily available for each state from the U.S. Census Bureau. However, the Center recognizes limitations exist for both measures. For instance, total crop acreage might be a better measure of agricultural activity in some states, such as Hawaii, that have large amounts of pineapple, sugarcane, and other crops that are not harvested annually.

[4] U.S. Bureau of the Census, *Statistical Abstract of the United States: 1992* (112th edition), Washington D.C., 1992.

[5] When the Center surveyed state pesticide programs in August 1993, Nebraska was the only state that lacked enforcement powers. Since then, however, the Nebraska legislature has enacted legislation enabling the state to assume pesticide enforcement responsibilities from the EPA. The Nebraska legislature also increased its pesticide program's annual budget to $750,000.

[6] N.C.G.S. 143-468 created a Pesticide Environmental Trust Fund to help pay for new health and environmental programs. The law imposes additional registration fees on pesticide products, with one-fourth of the funds being used to pay for agromedical efforts at N.C. State and East Carolina universities. Three-fourths of the funds are earmarked for the Department of Agriculture's environmental programs, including the monitoring of groundwater pollution by pesticides and the disposal of pesticide containers. North Carolina already charged registration fees of $30 per pesticide product. The new law imposes additional assessments of $25 per product for pesticides with sales less than $5,000 a year, and $50 per product for those with sales greater than $5,000 a year.

[7] For further discussion of the state's pesticide oversight boards, see the N.C. Center for Public Policy Research's report, *Boards, Commissions, and Councils in the Executive Branch of North Carolina State Government*, 1984, pp. 77–95 and 192–194.

[8] North Carolina requires notification in two limited circumstances: aerial applicators seeking to spray in restricted areas, such as parks; and those spraying within 1/2-mile of registered apiaries (bee colonies).

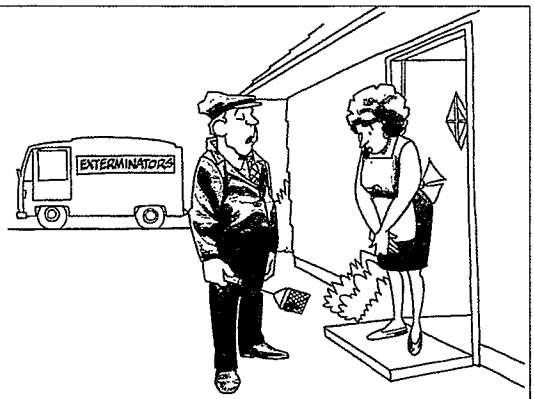
[9] In early 1994, Congress delayed implementation for most of the requirements in its Worker Protection Standard until Jan. 1, 1995.

[10] 2 N.C. Administrative Code 9L .1805.

[11] See Stuart Leavenworth, "State won't request pesticide rules delay," *The News & Observer* (Raleigh, N.C.), Nov. 10, 1993, p. 5A.

[12] From a news release issued by the N.C. Department of Agriculture, Nov. 12, 1993.

[13] The N.C. General Assembly debated the issue of moving its pesticide program in 1989, when it consolidated most of the state's environmental programs into the new Department of Environment, Health, and Natural Resources. Legislators decided to leave the pesticide program in the Department of Agriculture, however, in response to complaints from farmers and other agricultural interests.



"I may be slow, madam, but I'm thorough."

V.
Recommendations: State Regulation of Pesticides

The N.C. Center for Public Policy Research, in its review of state pesticide regulations, identified strengths and weaknesses in North Carolina's program. On the positive side, our 50-state survey found that North Carolina's pesticide program was among the most comprehensive in the breadth of its responsibilities and extent of its regulatory powers. North Carolina also ranked high in total spending and staffing for pesticide programs, as well as various measures of regulatory activity—including total fines assessed on violators, the number of applicator licenses suspended or revoked, and the number of complaints investigated.

The Center's research also found areas where North Carolina is lagging. Our review of enforcement records found shortcomings in North Carolina's regulation of aerial applicators, its

Ken Taylor, N.C. Wildlife Resources Commission

methods for penalizing violators, and the balance of public interests on the boards that oversee pesticide regulation. In addition, our survey found that North Carolina trails many states in its record-keeping and reporting requirements for pesticide applicators, and the hours of training needed for applicators to renew their licenses and certifications.

North Carolina cannot afford to ignore these shortcomings. Scientific authorities rank pesticides as a relatively high risk compared to other environmental problems in their potential to cause health and ecological damage.[1] Therefore, the Center recommends the following policy actions in areas of pesticide regulation:

1 The N.C. Department of Agriculture and the Pesticide Board should revise their system of punishing violators of pesticide regulations to: (A) assess more consistent fines and penalties; (B) punish more harshly serious violations and repeat offenses; and (C) cease the current practice of negotiating penalty settlements with violators.

The Center's review of the N.C. Department of Agriculture's pesticide enforcement actions found numerous inconsistencies in the amounts of fines and lengths of suspensions assessed on violators. Such inconsistencies were particularly apparent with the Pesticide Board, which negotiates settlements with violators rather than using a system that assigns standard penalties. Consider the following examples, both involving aerial applicators who were penalized by the Pesticide Board for violating pesticide regulations between 1983 and 1992:

- H. Ray Meads of Elizabeth City was fined $250 in 1985 for his first violation incident. In 1990, Meads was fined $2,500 for five separate violation incidents. Yet he was fined only $300 for a seventh incident in 1991. Meads received a two-month suspension for an eighth incident, but he has appealed that penalty.
- D. Carroll Vann of Greenville was fined $1,200 in 1990 his first violation incident, yet only received a warning letter in 1992 for his second and third incidents. In 1993, he was fined $500 and received a one-month license suspension for his fourth and fifth incidents.

Such inconsistencies often give the impression that the severity of penalties is more related to the negotiating skill of violators than the severity of their offenses. *To dispel that notion, the N.C. Center recommends that the Pesticide Board stop its current method of negotiating fines and penalties with violators. Instead, the board should develop a matrix system that sets standard fines and penalties based on factors such as severity of incidents, damage involved, illnesses or deaths caused, and number of previous violations. The new penalty system should include a method for assessing harsher penalties on repeat violators, comparable to the "point system" used for traffic violators.*

North Carolina cannot afford to ignore shortcomings in its programs for regulating pesticides. Scientific authorities rank pesticides as a relatively high risk compared to other environmental problems in their potential to cause health and ecological damage.

Records show that a small percentage of repeat offenders, primarily aerial applicators and exterminators, account for many of the pesticide violations. For example, repeat violators were involved in about 45 percent of all aerial application incidents in 1991 and 1992. The higher violation rates and numbers of repeat offenders among aerial and structural pest applicators also raise serious concerns. That's because those two groups of applicators have perhaps the greatest potential to affect public health and the environment.

Several Pesticide Board members have advocated this point system concept, while criticizing the current method of negotiating fines. For guidance in developing a new penalty system, the Pesticide Board could look to other state panels, such as the Environmental Management Commission, that use matrix systems in assessing fines. In fact, the Department of Agriculture's Structural Pest Control Committee already uses a penalty matrix—resulting in more consistent fines and penalties.

Both the Pesticide Board and the Structural Pest Control Committee should assess higher fines

for more serious incidents and for repeat offenders. State law limits pesticide fines to $2,000 per violation, and the N.C. Center does not propose raising that limit. But the state's pesticide oversight boards rarely assess fines that approach the maximum, and both panels should make more use of their authority within current guidelines. The Pesticide Board averaged $494 per fine from 1988 to 1992, while the Structural Pest Control Committee averaged $668. (See Table 8 on p. 48.) Our survey shows that the average fine assessed on violators in North Carolina is much lower than in many states—even though North Carolina is among the leaders in total fines. (See Table 21 on pp. 80–81.) The average fine assessed in North Carolina from 1990–92 was $601—less than one-fifth of that among other states, which averaged $3,434 per fine.

2 The Pesticide Board should take actions to reduce the numbers of violations by aerial applicators, who account for an undue proportion of the state's pesticide violations. Such actions should include imposing harsher penalties on repeat offenders and requiring aerial applicators to notify nearby residents by posting signs before spraying.

Center research found that, among pesticide users, aerial applicators had the largest violation rate—*or, the number of violation incidents per applicator by type.*[2] From 1988 to 1992, aerial applicators were involved in about 27 violation incidents for every 100 applicators—a rate far higher than any other user category. The second-highest category, exterminators, had a violation rate of seven incidents per 100 applicators. (See Table 10 on p. 52) Put another way, aerial applicators were involved in nearly as many violation incidents as private applicators—even though private licensees outnumbered aerial licensees by 28,650 to 194. Aerial applicators also accounted for more than a third (36 percent) of the *repeat* violators over the five-year period. (See Table 11 on p. 55.)

Pilots say their higher violation rate is due to three factors: their high visibility; the large amount of land they treat relative to other types of applicators; and the strictness of North Carolina's regulations, which they describe as among the harshest in the nation. There is some truth in those claims. But it's also true that aerial spraying is more prone to drift off-site than other types of pesticide application, thereby posing greater hazards to the environment and public health.

North Carolina regulations already prohibit all drift from aerial spraying—it's hard to get much tougher than that. Yet more actions are clearly needed to reduce complaints and violations. Imposing harsher penalties on repeat violators is one step in that direction.

Another much-needed change is requiring aerial applicators to notify nearby residents before spraying fields.[3] Pilots have opposed notification requirements because of the difficulties and delays involved in identifying and contacting residents by letters, telephone calls, or advertisements. Such concerns are legitimate. *The Center recommends instead that pilots provide advance notice to nearby residents by posting standardized signs around target sites before spraying.* Administrators with

We used to read in old poets about the scent of the earth

And grasshoppers. Now we bypass the fields:

Ride as fast as you can through the chemical zone of the farmers

The insect and the bird are extinguished. Far away a bored man

Drags dust with his tractor, an umbrella against the sun.

What do we regret? . . .

—Czeslaw Milosz, Nobel Prize winner, excerpt from the poem, "Advice"

The Center's review of the N.C. Department of Agriculture's pesticide enforcement actions found numerous inconsistencies in the amounts of fines and lengths of suspensions assessed on violators. Such inconsistencies often give the impression that the severity of penalties is more related to the negotiating skill of violators than the severity of their offenses.

the Massachusetts pesticide program say they have reduced aerial application problems since they began requiring pilots to post signs prior to spraying. That seems a reasonable approach.

The Center also recommends that the Pesticide Board and/or the General Assembly ***study the merits*** *of several other proposals aimed at regulating aerial applicators, including: (A) increasing the buffer zones in which spraying is prohibited around residences from the currently required 100 feet to 300 feet; (B) adopting a more lenient standard than the current "no deposit" rule for pesticide drift in buffer zones; (C) requiring mandatory liability insurance for aerial applicators,*[4] *which was required by state law from 1953 to 1971; and (D) adopting stronger training requirements for the renewal of certifications.* (See further discussion of training requirements in Recommendation 6.)

3 The N.C. General Assembly should enact legislation giving the Structural Pest Control Committee the authority to penalize *unlicensed and uncertified* violators of its regulations.

Unlike the Pesticide Board, the Structural Pest Control Committee currently does not have the power to fine or otherwise punish unlicensed or uncertified exterminators who violate state pesticide regulations. As a result, the structural pest board must refer such cases to the courts—thus contributing to the backlog of cases in the court system and resulting in unnecessary costs for taxpayers. In 1992 alone, 12 cases involving unlicensed and uncertified exterminators were tried in the court system. Transferring that authority to the Structural Pest Control Committee would speed up the handling of such cases and rid the court system of an unneeded burden.

4 The N.C. Department of Agriculture should start compiling accurate data on the amounts of pesticides used statewide in order to assess and correct potential health and environmental problems, including groundwater contamination. The state also should develop a mandatory system for the reporting of pesticide-related illnesses, injuries, and deaths.

Available data on pesticide use are, at best, "guesstimates." Neither North Carolina nor the federal government require pesticide applicators to report the amounts of chemicals they use. Therefore, there are no solid numbers on the amounts of pesticides applied by county or by state. The same is true for pesticide-related health records.

Accurate information would be valuable for a number of reasons, including: determining where to concentrate regulatory and training efforts; conducting recalls of canceled pesticide products; monitoring and correcting potential environmental problems, such as groundwater contamination; and detecting and dealing with potential health problems associated with pesticides. The information also could benefit farmers, who are among the most vulnerable to potential groundwater contamination and pesticide-related health problems. About half of North Carolina's citizens and virtually all of its rural residents get their drinking water from wells.

Critics say that compiling pesticide-use data would be a burden for farmers and sap resources from regulatory programs. Yet much information is already available. *Federal law requires applicators of restricted-use pesticides to keep records on their pesticide use for two years following applications.* Applicators must supply those records upon request to regulators, inspectors, or licensed health-care professionals. But the law does not require pesticide users to systematically report that same information to the states or the federal government.

Despite the lack of federal reporting requirements, at least 10 states already collect such data.[5] Some states have been doing so for 20 years or

more, and many of those states have smaller pesticide budgets than North Carolina. For example, New Hampshire has collected pesticide-use reports since 1965—with a budget one-tenth the size of North Carolina's in FY 1992–93. States with reporting requirements have used their records to monitor and deal with health and environmental problems, such as groundwater pollution. The New Hampshire program found from its records that some applicators were misusing the herbicide clomazone, causing contamination problems. Regulators in California used their records to track down users of methyl bromide after studies found that it could pose health risks to people who fumigate buildings with the chemical.

The higher violation rates and numbers of repeat offenders among aerial and structural pest applicators raise serious concerns. That's because those two groups of applicators have perhaps the greatest potential to affect public health and the environment.

The North Carolina Pesticide Law of 1971 gave the Pesticide Board the authority to "collect, analyze and disseminate information necessary for the effective operation of the programs."[6] Currently, the board requires *record-keeping* for: certain sales of restricted-use pesticides by dealers; applications of restricted-use chemicals by licensed users; and use of *all* pesticide products by aerial applicators. But the board has shied away from adopting *reporting* requirements, contending that such regulations would draw resources from existing enforcement efforts. However, such concerns have not deterred the Department of Agriculture from collecting annual production records for a wide variety of crops and livestock across the state. The department also began collecting limited data on pesticide use in 1992, based on a sample of less than 1 percent of the state's 59,000 farms.

Ideally, the Pesticide Board should require all applicators to report their use of all pesticides. But such complete reporting could be expensive and time-consuming to collect and analyze. However, the board could obtain much valuable information on pesticide usage with relatively little effort. *At a minimum, the Pesticide Board and the Department of Agriculture should compile annual statewide pesticide-usage reports based on statistical samples of people who apply restricted-use chemicals. Plus, the General Assembly should appropriate funds for the additional staff and resources that the Agricultural Statistics Division needs to compile and analyze those reports.* Although pesticide applicators may oppose such reporting requirements, federal law already requires them to keep records on their use of all restricted-use chemicals—which comprise only 3 percent of the 12,391 pesticide products registered for use in North Carolina in 1992.[7]

North Carolina also should join the 13 states that require physicians and hospitals to report pesticide-related illnesses, injuries, and deaths. The data compiled from this effort would go hand-in-hand with pesticide-use records in helping to monitor and deal with potential health problems associated with pesticides. The Center's survey found that such reporting is required in about one-third of the states, including neighboring South Carolina.

5 The N.C. General Assembly should rewrite the statutes regarding appointments to the state's three pesticide oversight and advisory panels to ensure that each board includes a broader balance of public interests. Also, the Governor and the N.C. Pesticide Board should closely follow the requirements of the state Pesticide Law when making any new appointments to the state's pesticide oversight and advisory boards.

The three panels include: the Pesticide Board, which regulates agricultural and many commercial uses; the Pesticide Advisory Committee, which provides technical advice to the board; and the Structural Pest Control Committee, which regulates exterminators and fumigators. (See Tables 2–5 on pp. 36–42 for membership requirements of these boards.) Currently, all three boards are heavily weighted with members representing agriculture, industry, and state agencies. The legislature needs to ensure that these panels include representation from other groups that have a stake in pesticide regulation, such as environmentalists, farmworkers, and farmers who use alternative methods of pest control.

The need for change is apparent because two of the boards' membership rosters have violated

the state Pesticide Law. For instance, the law specifies that one at-large member of the Pesticide Board shall be a "nongovernmental conservationist," but no member meets that qualification. Also, neither of the board's current at-large members claim to fill the conservationist seat: Board Chairman Jerry Coker is an engineer with Weyerhaeuser Co. in Plymouth, and Lu Ann Whitaker is a Raleigh homemaker. Likewise, the Pesticide Advisory Committee is supposed to include an "ecologist," yet that seat was filled by a retired farmer until August 1994.[8]

The laws establishing all three pesticide boards need amending to ensure input from groups not currently represented, in particular environmentalists. As noted, the environment-related seats on the Pesticide Board and the Pesticide Advisory Committee have not always been filled by environmentalists. Also, state law does not require the presence of an environmentalist on the Structural Pest Control Committee. In particular, the Center recommends the following changes in the laws specifying appointments to the state's pesticide oversight and advisory boards:

A) The Pesticide Board should include an environmentalist from a non-profit, public-interest group as a substitute for one of its two at-large members.

B) The Structural Pest Control Committee should include an environmentalist from a non-profit, public-interest group as a substitute for one of its two members who are involved in the pest control industry.

C) The Pesticide Advisory Committee, because of its larger size, should include several additional interests that currently are not represented. These include: an environmentalist from a non-profit, public-interest group as a substitute for the committee's conservationist seat; an environmental scientist as a substitute for its ecologist seat; a farmworker advocate as a substitute for its at-large member from the general public; and a researcher or farmer involved in integrated pest management or alternative methods of pest control as a substitute for one of its three practicing farmers.

Regardless of whether the legislature enacts such changes, the Center also recommends that:

D) The Governor—when appointing new members of the Pesticide Board—should select persons with backgrounds that are truly representative of the slots they are supposed to fill under the state Pesticide Law.

E) The Pesticide Board—when appointing new members of the Pesticide Advisory Committee—should select persons with backgrounds that are truly representative of the slots they are supposed to fill under the state Pesticide Law.

Such changes in laws governing appointments to boards and commissions are not without precedent. For instance, in 1991 the legislature amended state law to require the representation of a consumer advocate and a health professional on the Structural Pest Control Committee.[9] In 1989, the legislature more clearly defined the membership of the Coastal Resources Commission—in response to complaints that too many developers were serving on the coastal planning panel.[10]

6 The Pesticide Board and the Structural Pest Control Committee should increase the training requirements for the renewal of pesticide licenses and certifications, particularly with regard to aerial applicators and exterminators. At a minimum, the state should require *all applicators* to complete 10 hours of training every three years.

The Center's nationwide survey found that North Carolina is among the leaders in *penalizing* pesticide violators, but the results suggest that the state could do a better job of *preventing* violations. Stronger educational requirements—that is, longer and more frequent training—are an effective way to put more emphasis on prevention.

Educational requirements are hard to compare because the states often categorize applicators differently. Nevertheless, the Center's survey found that most states have more extensive training requirements than North Carolina. For example, Colorado's requirements range from 36 hours for commercial applicators to 160 hours for extermi-

The North Carolina Pesticide Law of 1971 gave the Pesticide Board the authority to "collect, analyze and disseminate information necessary for the effective operation of the programs."

The state's pesticide oversight and advisory boards are heavily weighted with members representing agriculture, industry, and state agencies. The laws establishing all three boards need amending to ensure input from groups not currently represented, in particular environmentalists.

nators, with a three-year renewal cycle. The state of Washington requires 40 hours of training every five years for all applicators.

North Carolina has different training requirements for many types of applicators, but most are among the weakest of all the states surveyed. Current training requirements range from two hours every three years for private applicators to 10 hours every five years for horticultural applicators. (See Table 7 on p. 47.) Some pesticide applicators are not required to get any training at all. For instance, the lawn-care technicians who apply pesticides around people's homes are supposed to work under the supervision of licensed applicators but have no formal training requirements. *The state should require all pesticide applicators to complete at least 10 hours of training every three years.* This minimum requirement should apply to farmers and other certified private applicators as well as the "technicians" who work under supervision.

Stronger training requirements are particularly important for aerial applicators and exterminators because those groups of applicators cause the most violations and have the greatest potential to affect public health or the environment. Records show that aerial applicators and exterminators have the highest violation rates among pesticide applicators and account for most of the repeat offenses.

At a minimum, the Pesticide Board should require at least 20 hours of training every three years for the certification of aerial applicators, given their high violation rate. Currently, aerial applicators need only four hours of training every two years to renew their certifications—a requirement exceeded by 26 states. States with even stronger training requirements for aerial applicators include: Oregon, 45 hours; Washington, 40 hours; neighboring Tennessee, 28 hours; Rhode Island, 24 hours; California and New Jersey, 20 hours.

Similar steps should be taken by the Structural Pest Control Committee, which should require that all exterminators be certified and complete at least 15 hours of training every three years. Currently, structural pest applicators can be certified by completing as little as five hours of training every five years. Plus, more than half (52 percent) of all structural pest applicators are uncertified technicians, whose sole training requirement is to watch a 45-minute videotape. The Center's survey found that at least 12 states have stronger training requirements for exterminators than North Carolina. States with more extensive requirements include: Oregon, 45 hours; Washington, 40 hours; Tennessee, 28 hours; Rhode Island, 24 hours; and New York and Oklahoma, 20 hours.

7 The Department of Agriculture should expand its public education efforts regarding safe pesticide use to help stem the large number of violations by *unlicensed and uncertified* applicators.

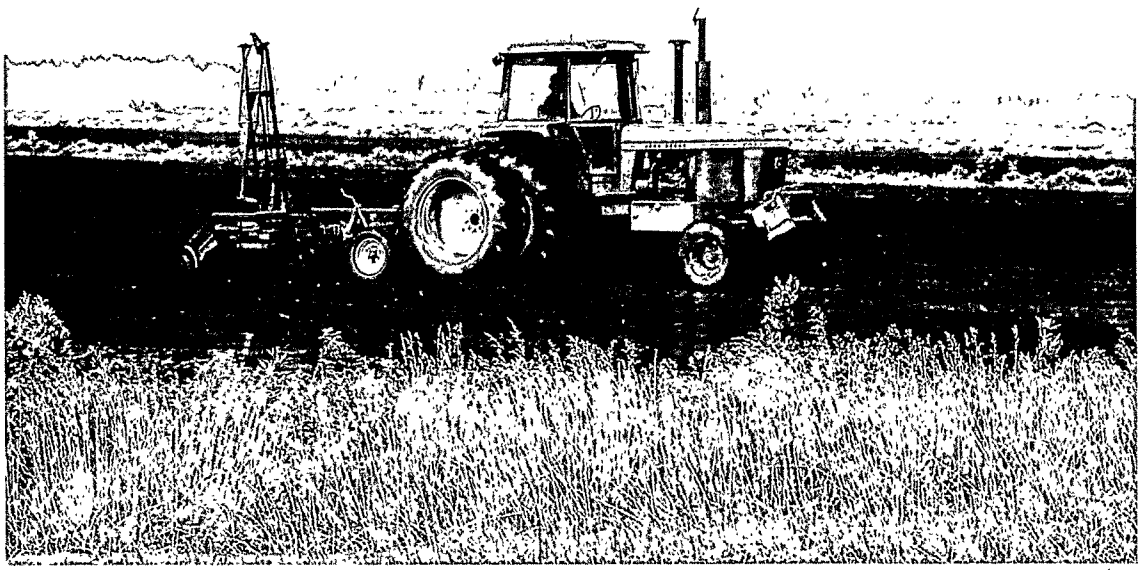
The Center's nationwide survey found that North Carolina is among the leaders in penalizing pesticide violators, but the results suggest that the state could do a better job of preventing violations. Stronger educational requirements —that is, longer and more frequent training—are an effective way to put more emphasis on prevention.

Because you can die of overwork, because you can die of the fire that melts rock, because you can die of the poison that kills the beetle and the slug, we must come again to worship you on our knees, the common living dirt.

—MARGE PIERCY, POET
FROM "THE COMMON LIVING DIRT" IN *STONE, PAPER, KNIFE* (1983)

Unlicensed applicators account for one-fourth of the state's violation incidents—second highest among the types of pesticide users. (See Table 10 on p. 52. These violations generally include two types: home gardeners who carelessly apply pesticides bought from garden centers but aren't required to obtain licenses; and landscape workers and exterminators who illegally apply pesticides for money without obtaining licenses. Most unlicensed applications result in minimal damage, but some have caused serious accidents and injuries. For example, in 1989 an uncertified farmworker in Bladen County accidentally mixed a container of the insecticide Counter with cow feed—killing 125 head of cattle.

The N.C. Department of Agriculture has available pamphlets and posters on pesticide safety that it can supply to dealers and garden shops. But the Pesticide Board does not *require* dealers to provide such information to consumers, and many dealers don't bother. As a result, most gardeners probably are not aware that it is illegal to apply pesticides on someone else's property (or for money) without a license. Many gardeners also



Ken Taylor, N.C. Wildlife Resources Commission

might not know that "the label is the law" regarding pesticide use. That is, it's illegal to apply pesticides in ways inconsistent with the directions listed on the small, hard-to-read labels on pesticide bottles and boxes.

The Department of Agriculture should expand its public education efforts by distributing pesticide-safety information to all dealers and garden shops. The Pesticide Board also should require those dealers, at a minimum, to post signs with basic information on pesticide safety. The state wouldn't have to write such material because of the availability of existing publications. For instance, the EPA publishes an inexpensive, 24-page pamphlet, "Citizen's Guide to Pesticides," that contains all the information the average person needs to know about the safe handling of pesticides.[11]

Many gardeners might not know that "the label is the law" regarding pesticide use. That is, it's illegal to apply pesticides in ways inconsistent with the directions listed on the small, hard-to-read labels on pesticide bottles and boxes.

8 The N.C. General Assembly should establish a study commission to re-examine the merits of moving pesticide regulatory programs from the Department of Agriculture to the Department of Environment, Health, and Natural Resources. The N.C. Center makes no recommendation on whether the program should be moved.

Perhaps no issue in pesticide regulation has caused more debate than this question: Can an agricultural agency regulate pesticide use without favoring farmers at the expense of public health and the environment? Congress considered that issue in 1970, when it transferred pesticide regulation from the U.S. Department of Agriculture to the newly created Environmental Protection Agency. In North Carolina, the state legislature considered the issue in 1989, when it consolidated most of the state's environmental programs into the new Department of Environment, Health, and Natural Resources. At that time, the legislature decided to leave pesticide regulation in the Department of Agriculture.

The Center's research suggests that the legislature should take another look at this issue. Our survey found that pesticides are regulated through agricultural agencies in 43 states (86 percent), environmental agencies in five states (10 percent), and public universities in two states (4 percent). However, our survey found substantial differences in the level of regulatory activity when we compared states with pesticide programs based in agricultural agencies versus those in environmental agencies. (See Table 26 on p. 91.) On average, the environment-based programs levied more fines, suspended or revoked more licenses, and investigated more complaints. The environmental programs also had much larger budgets and staffs. The differences between environment- and agriculture-based pesticide programs held up even when various factors were adjusted for state populations and crop acreages.

Some observers say such discrepancies add weight to environmentalists' contention that having an agricultural agency regulate pesticide use is like letting the fox guard the chicken house. Others, however, could interpret the survey findings differently. Agriculture advocates could argue that the environment-based programs take more regulatory actions because they do a poorer job of educating pesticide applicators and thus have more violations. Nevertheless, the Center's survey found little difference in the educational

On average, the environment-based pesticide programs levied more fines, suspended or revoked more licenses, and investigated more complaints. The environmental programs also had much larger budgets and staffs.

The modern environmental movement, though it has shifted its emphasis from preservation of precious resources to control of pollution caused by our industrial and agricultural practices, declares our dependence on the earth and our responsibility to it...

—WALLACE STEGNER, *WHERE THE BLUEBIRD SINGS*

requirements for states with agriculture-based programs versus those in environment-based programs. Plus, virtually all of the states—including North Carolina—train pesticide applicators through their cooperative extension services.

The issue also hinges on the ageless philosophical debate over the proper role of government regulation. That is, is it better for government agencies to focus on policing and punishing violators of pesticide regulations? Or, is it better for government agencies to stress the promotion of safe pesticide use while taking a more lenient stance against violators? The state legislature is the proper place to resolve such questions.

FOOTNOTES

[1] U.S. Environmental Protection Agency, "Unfinished Business: A Comparative Assessment of Environmental Problems," Office of Policy Analysis, February 1987, pp. 84–86.

[2] The Center calculated violation rates by dividing the number of violation incidents in each applicator type by the number of applicators in that category and multiplying the result by 100. Violation incidents were defined as pesticide cases that culminated in hearings or settlement agreements through the Pesticide Board or the Structural Pest Control Committee.

[3] Currently, North Carolina requires notification in only two limited circumstances: aerial applicators seeking to spray in restricted areas, such as parks; and those spraying within 1/2-mile of registered apiaries (bee colonies).

[4] Aerial applicators were required to carry liability insurance under the N.C. Aerial Crop Dusting Law (G.S. 4B, Chapter 105) from 1953 to 1971. The General Assembly dropped the insurance requirement while enacting the N.C. Pesticide Law of 1971.

[5] The Center's survey identified 10 states that require pesticide applicators to file usage reports, including California, Connecticut, Kansas, Massachusetts, Missouri, Montana, New Hampshire, Rhode Island, Utah, and Vermont. In addition, 13 other states require applicators to report their usage "sometimes."

[6] N.C.G.S. 143-437.3.

[7] According to the N.C. Pesticide Section, manufacturers registered 375 restricted-use pesticides for use in North Carolina in 1992—accounting for 3.0 percent of all registered pesticide products and 8.3 percent of all agricultural-use pesticides.

[8] In response to criticisms, the N.C. Pesticide Board agreed to consider new nominations to the Pesticide Advisory Committee at its August 9, 1994, meeting. At that time, the Board replaced the farmer, John McLaurin of Scotland County, with Dave Adams, a retired N.C. State University forestry professor.

[9] N.C.G.S. 106-65.23.

[10] N.C.G.S. 113A-104.

[11] "Citizen's Guide to Pesticides," U.S. Environmental Protection Agency, Washington, D.C., Publ. No. 20T-1003, 1990, 24 pp.

The N.C. Supreme Court at 175: Slow on Civil Rights but Fast on Free Speech?

by Katherine White

What follows is a look at some of the highs and lows of the North Carolina Supreme Court during its first 175 years. The General Assembly, originally viewing the court only as a money-making venture for lawyers, voted it into existence in 1818. It succeeded a series of earlier, similar tribunals, one of which operated under the provision that "no attorney shall be allowed to speak or be admitted as counsel in the aforesaid court."[1] That much has changed, but much about the state's highest court has remained the same over the years. Unlike the General Assembly, which often makes sudden or sweeping legal changes in the give-and-take of politics, the Court makes law slowly, by interpreting the constitution, the legislature's statutes, and its own past decisions. The Court's work is seen primarily through its published review of cases, raising issues of particular import to the life and times in which the justices served.

The North Carolina Supreme Court, now celebrating its 175th anniversary, has an august—if sometimes notorious—history. It has promoted prison reform, abolished certain invasion of privacy torts, advanced women's rights, and determined whether chickens fall within the protection of a statute prohibiting cruelty to animals.

On its less noble side, the court has defended slavery and it was often a necessary, but useless, step for those litigating civil rights issues in the 1950s and 1960s. Its refusal to recognize certain constitutional rights during that period resulted in at least one landmark decision by the U.S. Supreme Court that continues to benefit all Americans—the right to a speedy trial.[2]

Because the Court has dealt with such a range of issues, it is difficult to draw sweeping themes from its history. In most cases, the Court's decisions have reflected the status quo. There are, however, exceptions to this rule. The Court, for example, traditionally has been ahead of its time on free speech issues and behind the times on civil rights issues.

Eighty white men have shaped the course of the state's legal history, with three white women joining their ranks since 1962 and only one black man, appointed in 1983.[3] The number of justices in office at one time has varied from three to seven. Almost all of the justices in this century have been Democrats, two of the turn-of-the-century Republican members having faced impeachment charges for defying the General Assembly by ordering the State Treasurer to pay out money that had been forbidden by legislation.[4]

The North Carolina high court traditionally reflects the state's power structure, its members being appointed or elected from a group with

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impeccable political credentials. Its opinions have mirrored the state's evolving political and social development, not making wholesale legal changes as other states' courts have, and taking few steps that alter the way business is done.

A Foot Firmly Rooted in the Past

The Court is one of tradition. Tradition governs the way justices file into the courtroom, parcel out their workloads, assign seats at the bench, vote their opinions, and take their midday meals.[5] And until it made the switch in 1940, the Court was the last appellate court in the United States where the members wore ordinary clothes instead of robes while on the bench.[6]

Ties to the past are, in a sense, part of the Court's function. The six men and one woman now serving as justices sit at the highest level in the judicial branch of government.[7] They are the guardians of several centuries of North Carolina law.

The Court's early years were marked by informality, according to Judge Rich Leonard, currently a U.S. bankruptcy judge who studied the Court's work of 1841 and 1897.[8] Citizens argued their own cases without using an attorney in about half of the 1841 cases. Most of these disputes involved property: land repossession, for example, or a case in which a homemade canoe was punctured by a borrower. The few criminal matters of the early Court seem minor by today's standards, though perhaps appropriate for the times: indictments for crimes like selling rotten bear meat as food and changing the identifying markings on sheep.

But by 1897, the Court had become more formal. Attorneys argued nearly every case for their clients. A 30-day deadline on appeals was by then being enforced, compared to an 1841 practice of letting appeals miss their deadlines by two years or more.

Yet much about the Court has resisted change. The Court's dealings with capital punishment reflect its constancy.[9] Retired Justice Harry C. Martin, in a history prepared for the 1994 celebration, notes that the Court today spends nearly half its time on death penalty cases. He observes that in 1919, T.T. Hicks, a lawyer involved in the Court's Centennial Celebration, predicted that the Court would steer away from the death penalty. "Will not the conscientious men and women who meet to celebrate the next centennial of this court blush, as they turn these pages, to think that their ancestors in 1919 condemned human beings to death by law in North Carolina?"[10] But deliberations on death sentences are as much a part of the Court's work today as they were in 1919.

The North Carolina Supreme Court. Standing (l-r): Justices Willis Whichard, Henry Frye, John Webb, and Sarah Parker. Seated (l-r): Justice Louis Meyer, Chief Justice James Exum Jr., Justice Burley Mitchell.

Michael Lewis

A Voice for Better Jail Conditions

Despite its inherent conservatism, the Court has had isolated bursts of activism. In 1875, for example, the Court displayed an activist nature when upholding damages of $2,000 for the death of John Godwin in the Raleigh City Jail. The court concluded that his death "was accelerated by the noxious atmosphere" and that his 8x14 foot cell had "no opening connecting with the outer air or light," "no ventilation even." "Nature teaches us that any person kept in such a place must soon die, and any person 'lodged' in such a place is injured by the first breath . . . . Not a chair, nor a bed, nor a blanket, nothing but the cold, hard floor in 'a hole like Calcutta's.'"[11]

A Beacon on Free Speech Issues

Another area in which the Supreme Court historically has embraced change is that of issues affecting free speech. The first recorded prejudicial pre-trial publicity case, prior to the Supreme Court we know now, resulted in the court's concluding that the publicity meant nothing to the trial's outcome. "[T]he people of this country do not take for truth everything that is published in a newspaper."[12]

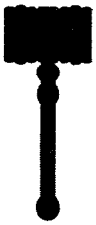
In 1962, the Supreme Court anticipated the U.S. Supreme Court's decision in *New York Times v. Sullivan* that gave protections to some false statements made about public officials. *Ponder v. Cobb* involved voting irregularities in Madison County and concluded that false accusations about public officials were not actionable if they were made in good faith and without malice.[13]

In the last decade, the North Carolina court has gained national recognition for its curbing invasion of privacy claims. In 1984, in *Renwick v. News & Observer Publishing Co.*, the Court concluded that false light invasion of privacy would not be part of the state's law in part because of its closeness to libel claims.[14] The Court also opined that allowing damages for such publication would add to the tension between freedom of the press—protected by both the state and federal constitutions—and the law of torts, which permits recovery of damages against the media.[15]

Following Renwick, in 1988, the Court went a step further when it ruled that North Carolina will not recognize yet another tort of invasion of privacy—when true private, personal facts are published.[16] The Court reasoned that the first Amendment of the U.S. Constitution, guaranteeing free speech and a free press, runs counter to a claim that can result in the recovery of damages for truthful publications.

But Behind the Times on Civil Rights

But if the Court consistently has broken new ground on free speech issues, it has been equally insistent on dragging its feet in the area of civil rights. In an 1830 decision, for example, the Court ruled that slave owners and overseers could not be prosecuted for how they treated slaves. The case stemmed from an incident in which a Chowan County slave owner named John Mann shot a slave in the back who had fled from him while he was whipping her. He was convicted of assault for inflicting punishment "cruel and disproportionate" to her transgression, but the



"Will not the conscientious men and women who meet to celebrate the next centennial of this court blush, as they turn these pages, to think that their ancestors in 1919 condemned human beings to death by law in North Carolina?"

—Lawyer T.T. Hicks
at the Centennial Celebration of
the State's highest court

Key Dates in the History of the N.C. Supreme Court

1819: The Supreme Court, meeting at the North Carolina State House, hears its first case as an appeals-only court.

1830: *State v. Mann.* Court rules that slaveowners and overseers cannot be prosecuted for how they treated slaves. Harriett Beecher Stowe later would cite the case as background for *Uncle Tom's Cabin.*

1834: *Hoke v. Henderson.* Court rules that a state officeholder has a property right in his office—a right found nowhere else in the nation. The ruling proves troublesome for both the state and the jurists who issued it and is overruled in 1903.

1834: *State v. Will.* Court gives slaves the right of self-defense against cruel and unjust punishment by owners. Overturned by 1857 *Dred Scott* ruling that slaves are not citizens.

1868: The Supreme Court is expanded from three to five members.

1873: *State v. Linkshaw.* Court reverses conviction of man charged with disturbing public worship by singing too loud and too long during church service.

1878: The Court licenses Tabithia Holton as the first woman to practice law in North Carolina.

1901: Republican Justices David Furches and Robert Douglas are impeached by the House of Commons. The trial centers on the 1834 *Hoke* decision. The House refuses to convict.

1914: *State v. Darnell.* Court, citing "natural law," rejects an ordinance prohibiting persons of a particular race from moving onto a street where a majority of the residents are of another race. The anti-segregation ruling goes largely unused.

1937: Court is expanded to seven members and becomes the last in the nation that doesn't wear robes. The Court dons robes in 1940.

1962: Susie Sharp becomes the first woman appointed to the Supreme Court.

1967: *Rabon v. Hospital.* Court abolishes charitable immunity for hospitals in malpractice and other damage cases.

1968: The creation of the 12-member Court of Appeals lightens the workload of the Supreme Court by taking on most trial court appeals.

1975: Susie Sharp becomes the first woman chief justice in the nation.

1983: Henry Frye becomes the first black appointed to the state's highest court.

1988: *Hall v. Salisbury Post.* The Court bars people from suing for invasion of privacy when true, personal facts are published.

1991: *Woodson v. Rowland.* Court rules that injured workers can sue their employers for gross negligence. Prior to this ruling, workers or their survivors would have been limited to collecting workers' compensation.

Sources include "N.C. Supreme Court 175th Anniversary," The News & Observer, *Raleigh, N.C., Jan. 7, 1994, p. 3A , and "Key Dates for the N.C. Supreme Court,"* The Charlotte Observer, *Jan. 4, 1994, p. 1C.*

Supreme Court threw out Mann's conviction on grounds that slavery demanded the total and unquestioning obedience of slaves. Harriet Beecher Stowe cited the case as background for *Uncle Tom's Cabin*.[17]

One justice was credited by Josephus Daniels, publisher of *The News & Observer*, as being the founder of the Ku Klux Klan in North Carolina. Daniels, at a ceremony unveiling the portrait of Justice Alphonzo Calhoun Avery in 1933, told of an encounter when Daniels asked the justice why he had supported a candidate for statewide office whose views on an important issue did not match the justice's. Justice Avery, pulling Daniels off to the side, whispered that the candidate had, like himself, been a night-rider.[18]

During the Civil Rights movement of the 1950s and 1960s, the Supreme Court was but a way station for cases en route to the U.S. Supreme Court. Daniel Pollitt, professor emeritus of constitutional law at the University of North Carolina School of Law, recalls, "The whole thing was to avoid the state courts as far as possible."[19]

The first such civil rights case grew out of a black Durham minister's 1956 effort to take children from his church group to the Royal Ice Cream store. The minister charged that the Durham ordinance requiring segregated facilities was unconstitutional. The North Carolina Supreme Court refused to consider the ordinance, stating that the defendants had failed to introduce it into evidence and that the Court could not take judicial notice of it, something clearly possible had the Court wished to do so.[20]

"While he may be a proper subject for discipline of the church, he is not for the discipline of the courts."

—N.C. Supreme Court in 1873 on overzealous churchgoer's joyful noise

A Few Progressive Voices

Still, the Court's predilection has not always been to preserve the status quo, and some of its jurists have shown a penchant for the progressive. Among them was Chief Justice Walter Clark, who served from 1889 to 1924 and retains a fabled and venerable reputation. Passed over as too young by Jefferson Davis, he was not made a Confederate general . And he was thought to be too old to be appointed by Woodrow Wilson to the U.S. Supreme Court in 1916, when Louis Brandeis was appointed in his stead, an appointment Clark supported.

But Clark made his mark at the state level. He advanced the rights of women, too often treated as "infants, idiots, lunatics and convicts."[21] He also supported making industry accountable for its actions, for example, requiring that a bottler of carbonated beverages be responsible for damages when the bottle exploded, even though there was no contract between the bottler and the ultimate consumer.[22] The Court under Justice Clark also held for the first time that a wife could sue her husband for damages, removing the bar of interspousal immunity.[23]

And it was Justice Clark who wrote into state law the common law principle that one's home is one's castle. In his opinion, he traced the concept from early England to a 1901 incident on South Street in Raleigh. There, a woman was accused of hitting a creditor of her husband's with her son's baseball bat. The defendant:

> knew naught of legal lore, but she had an instinctive sense of her rights, and, by means of the wooden wand touched to the back of the (creditor's) head she communicated electrically to his brain the same conception more effectually than if she had read to him the above citations.[24]

When Justice Clark died in 1924, the president of Southern Railroad came to his grave, relates Pollitt. Asked why he was there despite his legendary dislike for the Chief Justice and his pro-worker views, the railroad official replied, "I just want to make sure the son-of-a-bitch is dead."

Another notable justice was William Gaston, a vehement opponent of slavery and a Catholic, which meant he was technically prohibited from sitting on the Supreme Court by an N.C. Constitutional provision that limited officeholding to those of the Protestant faith. An 1835 change to the Constitution lifting that prohibition is attributed to the high regard in which Justice Gaston was held. Serving with him at the time was Justice Joseph Daniels, described as a man "of large brain,

but no ambition."[25] While Judge Gaston personally was opposed to slavery, he was unable to move the Court, which remained steadfast in its support of the institution.

Poetic Justice?

The Court has not been without scandal. A judge on an earlier court that functioned as a *de facto* Supreme Court was Samuel Spencer of Anson County, a polygamist. Spencer's death was chronicled in an official Supreme Court history after he was caught napping under the shade of a tree and pecked to death by a "turkey gobbler enraged by the red handkerchief which the judge had placed over his face to keep off the flies."[26] The document failed to mention Spencer's domestic proclivities or whether any related fatigue may have contributed to his nap and, thus, his untimely demise.

Strength in Times of Trial

Another notable characteristic of the Court is that it has often shown strength in the face of political adversity. After the Civil War, for example, the Court upheld the unpopular administration of W.W. Holden. Holden, appointed provisional governor after the Confederate defeat at Appomattox, was later elected and then impeached. The Court observed that without Holden's provisional term, there would be no state government.

> No one of the State officers was bound by an oath to support the Constitution of the United States and consequently no one of them was qualified to discharge the duties of their respective offices. There was no governor, no members of the General Assembly, no Judges. Every office in the state was politically dead, and the effect [was] the same as if they had all died a natural death. . . . Here, then, was a state of anarchy.[27]

And Protection for the Least Among Us

If it has upheld un-elected governors, the state Supreme Court also has shown a soft spot for bad singing. In 1873, while children continued to pray in public schools, the Court supported a different version of separation of church and state. W.M. Linkshaw was convicted at the trial level of disturbing public worship because his singing disrupted the congregation, causing laughter among some worshipers and indignation among others.

A summary of testimony at the trial revealed that "[a]t the end of each verse his voice is heard after all other singers have ceased and the disturbance is decided and serious; the church members and authorities have expostulated with him about his singing and the disturbance growing out of it, to all of which he replied that he will worship God according to the dictates of his heart and that a part of his worship is singing." The Supreme Court, reversing his conviction, concluded that "while he may be a proper subject for discipline of the church, he is not for the discipline of the courts."[28]

As for whether chicken abuse falls within the purview of a cruelty to animals statute, the answer is yes. The defendant in this case, enraged that his neighbor's chickens had dug up all his garden peas, chased down the chickens and dispensed his own brand of frontier justice. The Court, impressed by the intentional and vicious assault on the chickens, affirmed the perpetrator's $1 fine.

> He pursued one of the prosecutor's chickens clear across the lot of another neighbor and intimidated it into seeking safety in a brush pile; pulled it out ignominiously by the legs, and putting his foot on the victim's head, by muscular effort, pulled its head off. Then, in triumph he carried the lifeless body and threw it into the prosecutor's yard. Another he jabbed with a stick until it was dead and knocked another over, throwing their bodies into the neighbor's yard also, and then he on another occasion beat a hen that had young chickens, which, with maternal solicitude, she was caring for, so that she died and the biddies, lacking her fostering care, likewise perished.[29]

So the Court has had its say on issues large and small over the course of its 175 years. Former Justice Martin observes that the Court has at times been progressive, particularly with regard to workers' compensation issues.[30] The Court also has allowed recovery for injuries to unborn children and has expanded individual rights granted under the federal Constitution through reliance on state constitutional provisions. On criminal law, Justice Martin believes the Court is conservative, reflecting the social desires of the people who live in North Carolina.

The Court is a living entity. In its next 175 years it will continue to grow and change, although—if the past is any guide—perhaps more slowly than the times in which it operates.[31]

FOOTNOTES

[1] Walter Clark, "History of the Supreme Court of North Carolina," reprinted from the *North Carolina Booklet*, Uzzell & Co., Raleigh, 1919.

[2] *Klopfer v. North Carolina*, 386 U.S. 213, 87 S. Ct. 988, 18 L. Ed. 2d 1 (1967). Peter Klopfer, a zoology professor at Duke University, was charged with criminal trespass during a sit-in at a Chapel Hill restaurant. The Orange County District Attorney placed the case on an inactive docket but could have it reinstated by a judge at any time. Klopfer claimed the district attorney's practice violated his right to a speedy trial. The North Carolina Supreme Court held that the practice did not violate any rights. The U.S. Supreme Court disagreed, noting that the North Carolina court's position had been rejected by every other state court in the nation that had addressed the question, and concluded that "the criminal procedure condoned in this case by the Supreme Court of North Carolina clearly denies the petitioner the right to a speedy trial which we hold is guaranteed to him by the Sixth Amendment of the United States."

[3] The female justices were Susie Sharp, appointed in 1962; Rhoda Billings, appointed in 1985; and current Justice Sarah Parker, who in 1992 became the first woman elected to the state's highest court without being appointed first. Justice Henry Frye, appointed by Gov. James B. Hunt Jr. in 1983, is the sole African-American to have served on the state's highest court.

[4] Robert E. Williams, "High Court Gives Impression of Permanence," *The News & Observer*, Raleigh, N.C., April 26, 1942, p. C1; Walter Clark, *History of the Supreme Court of North Carolina*, 177 N.C. 617, 631–32 (1919). Chief Justice Clark does not mention political party affiliation in his history of the court's first 100 years. He does, however, reveal that most of the justices during that time—23—were Episcopalians. The remaining justices included three Roman Catholics, two Baptists, four Methodists, seven Presbyterians, and one Freethinker. *Id.* at 634. For a more recent discussion of the demographics of the state's judiciary as a whole, see Katherine White, et al., "The Demographics of the Judiciary: No Longer a Bastion of White Male Democrats," *North Carolina Insight*, Vol. 12, No. 4 (September 1990), pp. 39–48.

[5] At approximately 11:50 a.m. each day, the chief justice or a justice whose hunger pangs require immediate attention picks up the telephone and buzzes each justice in his or her chambers. The group then proceeds en masse down the capital's pedestrian mall as they discuss which of their regular spots they will choose for that particular day. Two favorites are the Hudson Belk cafeteria and a Greek-American eatery called the Mecca that is at least a third as old as the court itself.

[6] See Williams, footnote 4 above.

[7] The justices are: Chief Justice James Exum Jr., who has announced his retirement at the end of 1994; and Justices Louis Meyer; Burley Mitchell; Henry Frye; John Webb; Willis Whichard; and Sarah Parker.

[8] As cited in Joseph Neff, "Justices loosen up, toss a birthday party," *The News & Observer*, Raleigh, N.C., Jan. 7, 1994, pp. 1A & 3A.

[9] Only a hiatus granted by the U.S. Supreme Court has interrupted the state Supreme Court's near-constant deliberations over the death penalty. The U.S. Supreme Court held in 1972 that the Georgia death penalty statute was unconstitutional. Legislatures nationwide then redrafted their laws. In North Carolina, it took two attempts to enact a law that met constitutional standards, the current version being adopted in 1977. (*Furman v. Georgia*, 1972, *Woodson v. North Carolina*, 1976.)

[10] 176 N.C. 791 (1918).

[11] M. Lancaster, Raleigh, *An Unorthodox History of North Carolina's Capitol*, Down Home Press, 1992, p. 39.

[12] *State v. Norris*, 2 N.C. 430 (1789).

[13] 257 N.C. 281 (1962). The case was cited favorably by Justice Brennan in *New York Times v. Sullivan*, 376 U.S 272, 280 (1964).

[14] False light invasion of privacy is a civil claim for damages arising from the publication of false information about a person. The information usually is not defamatory, but it makes the person look like something he's not. Thus, he is put in a false light.

[15] *Renwick v. News and Observer Publishing Co.*, 310 N.C. 312, 312 S.E.2d 405 (1984), cert. denied, 469 U.S. 858 (1984).

[16] *Hall v. Post*, 323 N.C. 259 (1988).

[17] *State v. Mann*, 13 N.C. (2 Dev.) 263 (1829). See also Joseph Neff, "In the court of history, law review comes out a winner," *The News & Observer*, Raleigh, N.C., Jan. 9, 1994, p. 1C.

[18] Lancaster, supra, p.140–141. 204 N.C. 818, 824–825 (1933). Daniels was quick to point out that Justice Avery's Klan was far different from the KKK of the 1930s, which Daniels described as "spurious." The earlier version, he claimed, operated "for the protection of womanhood."

[19] With the conservative trend on the U.S. Supreme Court that began with former Chief Justice Warren Burger's term in 1969, the N.C. high court has begun using the *state* constitution to advance human rights issues. For more on this topic, see Katherine White, "North Carolina's Constitution Comes of Age," *North Carolina Insight*, Vol 10, Nos. 2–3 (March 1988), pp. 118–120.

[20] *State v. Clyburn*, 247 N.C. 455 (1958).

[21] *Weather v. Burdens*, 124 N.C. 610, 617 (1899).

[22] Martin, supra, p.4, citing *Grant v. Graham Chero-Coke Bottling Co.*, 176 N.C. 256 (1918).

[23] *Crowell v. Crowell*, 180 N.C. 516 (1920), cited by Justice Martin in *A Historical Review of the Supreme Court of North Carolina*, 1919–1994 (1994). 335 N.C. _____ (1994).

[24] *State v. Goode*, 130 N.C. 651, 654 (1902), described in Lancaster, supra, p. 27. The creditor was bent on repossessing a bed which Goode's husband was buying on time. Justice Clark wrote that he "laid his profane hands on the paraphernalia of her bed and began to throw back the bed covers and to lift the mattress, all of which would speedily have gone, of course, upon the floor."

[25] Rich Leonard, "Two Years in the Life of the Supreme Court of North Carolina," 1975, not published, Supreme Court Library Archives. See also Samuel Ashe, *Biographical History of North Carolina*, Volume II, VanNoppen Publishing, Greensboro, 1905, pp. 99–107, and Kemp P. Battle, *Address on the History of the Supreme Court*, Edwards & Broughton, Raleigh, 1889.

[26] Clark, *Ibid*, 177 N.C. 617, 619 (1919). His marital status is discussed in M. Lancaster, *Raleigh, An Unorthodox History of North Carolina's Capitol*, Down Home Press, 1992, p. 235.

[27] In the matter of William Hughes, 61 N.C. 65, 73 (1867).

[28] *State v. Linkshaw*, 69 N.C. 215, 216 (1873).

[29] *State v. Neal*, 120 N.C. 613 (1897).

[30] *Woodson v. Rowland*, 329 N.C. 330, 407 S.E. 2d 222 (1991). In this case, the court allowed workers to bring civil claims against their employers for injury caused by reckless and wanton acts of their employers. For more on the case, see Katherine White, "Work Place Injury Claims: Beyond Workers' Comp," *North Carolina Insight*, Vol. 14, No. 1 (May 1992), pp. 102–105.

[31] The Futures Commission for Justice and the Courts, a public-private panel, has been appointed to conduct a two-year study of what the structure of the state court system should be for North Carolina. An initiative of the Z. Smith Reynolds Foundation, the study was motivated by a perception of loss of public confidence in the criminal justice system. It remains to be seen what the impact of this study will be for the state Supreme Court. For more, see The Associated Press, "Study of State Courts Planned," *The News & Observer*, Raleigh, N.C., Jan. 25, 1994, p. 3A.

For Some, the Center's Legislative Effectiveness Rankings Rank Right up There Among Spring Rites; For Others, They Rankle

by Mike McLaughlin and Marianne M. Kersey

In April 1994, the Center released its effectiveness rankings for members of the 1993 General Assembly. This article discusses reaction to the Center's ninth set of legislative effectiveness rankings and looks at some of the larger trends the rankings suggest about the General Assembly as an institution.

For watchers of the North Carolina General Assembly, the Center's legislative effectiveness rankings have become a rite of spring. They get splashed across the pages of North Carolina newspapers in articles, editorials, endorsements, and letters to the editor; they make cameo appearances in campaign advertising by incumbents and challengers; and they provide more information to citizens in deciding how to vote on a particular candidate.

The rankings are a spring bouquet to success for legislators on the rise. For those who finish low, they are about as popular as another spring visitor—oak pollen. But like them or not, the rankings do provide a sort of report card on individual members of the General Assembly, and a check on trends affecting the legislature as an institution.

The pundits have even taken to issuing guidelines about how they should be interpreted. Here's what Paul O'Connor, columnist for the Capitol Press Association, has to say about reading the effectiveness-ranking tea leaves for the 1993 session of the General Assembly:

"Seniority plays a major role in effectiveness. Don't expect first- and second-termers to get high scores. If they do, re-elect them. Republicans score low because they are the minority party, and are by nature of the legislative process, less effective. One year's rank probably doesn't mean much. But, if your guy has been 120th for five terms straight, he's probably worth bringing home."[1]

The Daily Courier of Forest City, N.C., opines that "it is important that voters back home know how colleagues in the House and Senate view those we keep sending back to Raleigh.

"The survey should never be used as the sole basis for voters to decide an incumbent candidate's worthiness, but it can be and should be a useful tool in helping to analyze their job performances in Raleigh."[2]

Do legislators themselves find the rankings useful? "In any endeavor there are benchmarks," says Rep. Joe Hackney (D-Orange). "In baseball, you have a batting average. I'm sure people do pay attention."[3] Hackney ranked fourth in the House. Rep. Steve Wood (R-Guilford), who

Mike McLaughlin is editor of North Carolina Insight. *Marianne M. Kersey, a former Center policy analyst, administered the 1993 effectiveness rankings survey and compiled the results.*

ranked 94th of 120 representatives, calls the effectiveness rankings survey "a hocus-pocus poll whose scientific validity is on par with the editorial policy of local newspapers."[4]

Rep. Anne Barnes (D-Orange) placed eighth—the highest ranking ever for a female House member. Barnes says she views the rankings as constructive criticism—not as important as her biennial ranking by the voters at the ballot box, but helpful nonetheless. "I take it very seriously and try to be very careful in my appraisal of my colleagues," says Barnes. "It makes me think about everybody's work and about myself, and it gives me an indicator of how I'm doing."

High Rankings Nearly Automatic for Some People

The House speaker and the president pro tempore of the Senate always achieve a high ranking. House Speaker Dan Blue (D-Wake) and Senate President Pro Tempore Marc Basnight ranked number one in their respective chambers in 1993, although the top slot in the rankings isn't automatic for the holder of either office. Sen. Ken Royall (D-Durham)—a long time appropriations chairman and an authority on the state budget—retained the number one ranking in the Senate from 1977 until he retired in 1990. Royall was never president pro tempore of the Senate.

Indeed, an examination of who has been on top when provides a good illustration of how institutional changes affect legislative rankings.[5] Until 1989, the lieutenant governor—an executive branch officer—exercised a host of legislative powers while presiding over the Senate. But the Senate stripped the lieutenant governor of many of these powers in 1989 and assigned them to the president pro tempore. This, combined with Royall's retirement, cleared the way for the ascent of the president pro tempore to the top spot in 1991.

In the House, the speaker has been *numero uno* every year except 1989. That year Rep. Joe Mavretic (D-Edgecombe) presided over a House divided by the ouster of four-term Speaker Liston Ramsey (D-Madison).

Capital correspondent Danny Lineberry of *The Herald-Sun* in Durham, N.C., notes that much of the power centered in the offices of speaker and president pro tempore flows from their ability to appoint committee chairs. He correctly observes that a top-10 effectiveness ranking usually goes with being named chair of a high-powered legislative committee such as Appropriations or Finance.[6]

And Lineberry says the leaders of the House and Senate always have a committee or two where they can send legislation they want to control or kill. The chairs of those committees also do well in the rankings. Lineberry says one such committee is Judiciary I in the House, chaired by Rep. Mickey Michaux (D-Durham), who finished seventh in the rankings. Another is the Constitutional Amendments and Referenda Committee, chaired by House Majority Leader Toby Fitch (D-Wilson), who achieved a fifth-place ranking in the House. To this committee, Speaker Blue

"I TAKE IT VERY SERIOUSLY AND TRY TO BE VERY CAREFUL IN MY APPRAISAL OF MY COLLEAGUES. IT MAKES ME THINK ABOUT EVERYBODY'S WORK AND ABOUT MYSELF, AND IT GIVES ME AN INDICATOR OF HOW I'M DOING."

—*REP. ANNE BARNES (D-ORANGE)*

Senator Howard Lee (D-Orange) considers it a sign of progress in race relations that he has increased his influence in the Senate.

shunted two high-profile bills he strongly opposed—gubernatorial veto legislation and legislation authorizing a public referendum on a state lottery.

Lineberry concludes that because of institutional factors, some legislators are assured a lofty spot in the rankings. Others get there by developing expertise on an issue that happens to heat up at an opportune time. Here, he uses Barnes and her expertise on criminal justice matters as an example. Barnes, he notes, wielded considerable clout during the legislature's special session on crime.[7]

The effectiveness rankings also provide a window into trends that go beyond individual lawmakers. The latest rankings, based on performance in the 1993 General Assembly, confirm what legislative observers already suspected—increased clout for women and African-Americans in the General Assembly.

Legislative observers already had pegged 1993 as a watershed year for women in the General Assembly.[8] Record numbers of women were serving (31), and issues important to women—such as the bill ending the exemption for marital rape—were moving onto the legislature's agenda. The rankings bore out this perception of increased clout for women: Female lawmakers achieved their highest rankings ever.

Just as impressive were the gains of African-American lawmakers, who began moving up in the rankings in the House in 1991 with the ascent of House Speaker Dan Blue (D-Wake). The 1993 rankings saw even more African-Americans moving up in the House and African-American senators making impressive gains as well.

Center Executive Director Ran Coble says the 1993 rankings mark significant changes in the General Assembly. "The legislature's "good ol' boys club" has finally opened its doors to women and African-Americans," says Coble. "And as their numbers and longevity have increased, their legislative effectiveness has too."

Sen. Howard Lee (D-Orange), a second-term African-American now seeking a third term, agrees. He says he had the odd experience of having to respond to charges during a primary challenge that *he* was a good old boy in the ruling clique at the statehouse. "I certainly appreciated their recognizing that," says Lee. Lee—who jumped nine places to finish ninth in the 1993 rankings—considers it a sign of progress in race relations that he has enough influence in the Senate to be labeled a good old boy.

The fact that more women and blacks are serving in the General Assembly and serving more effectively means, of course, that more attention is given to issues important to blacks and women. In the 1993 session, women worked to pass bills ending the marital exemption for rape, toughening penalties for blocking abortion clinics, and increasing the state income tax credit for child-care expenses. Black lawmakers helped historically black campuses get their share of state construction money and got a study authorized to examine how much state business goes to minority-owned firms.

Top-ranking women were Sen. Beverly Perdue (D-Craven), who ranked 12th most effective in the Senate, and Barnes. Sen. Perdue is in her second Senate term, having served two previous terms in the House. She is chair of the Education/

Higher Education Committee and one of five vice-chairs of the powerful Senate Appropriations Committee. Rep. Barnes, serving her sixth full House term, is chair of the House Education Committee. Until this year, no woman had ever ranked above 16th in the Senate or 10th in the House since the Center began publishing the legislative effectiveness rankings in 1978.

Keys to Legislative Effectiveness

Asked to explain her rise in the rankings, Barnes offers several keys to legislative effectiveness. Effective legislators, she says, do their homework on the issues, get along with colleagues, know when to compromise and when to stand firm, and bounce back when they suffer setbacks. This she calls resilience.

But Barnes says she is particularly careful to do her homework. "I learn as much as I can about the subjects I've been assigned," says Barnes. "It's important to develop a knowledge base among the members. . . . We need to have some knowledge of our own and not be totally relying on others for that." Barnes first made herself House expert on criminal justice reform as co-chair of

Table 1. Effectiveness Rankings of the Top 10 Members of the 1993 General Assembly — N. C. Senate

Name of Senator	Effectiveness Ranking in 1993	Previous Effectiveness Rankings (Where Applicable)						
		1991	1989	1987	1985	1983	1981	1979
Basnight, Marc (D-Dare)	1	2	4	16	34	NA	NA	NA
Daniel, George B. (D-Caswell)	2	3	7	32	NA	NA	NA	NA
Plyler, Aaron W., Sr. (D-Union)	3	6	14	4	3 (tie)	25	(18)*	(28 tie)*
Sands, A. P., III (Sandy) (D-Rockingham)	4	8	20	37	NA	NA	NA	NA
Winner, Dennis J. (D-Buncombe)	5	5	5	12	16	30	NA	NA
Cooper, Roy A., III (D-Nash)	6	23 (tie)	(13)*	(45)*	NA	NA	NA	NA
Conder, J. Richard (D-Richmond)	7	11	17	21	35 (tie)	NA	NA	NA
Hyde, Herbert L. (D-Buncombe)	8	16	NA	NA	NA	NA	NA	NA
Lee, Howard N. (D-Orange)	9	18	NA	NA	NA	NA	NA	NA
Odom, T. L. (Fountain) (D-Mecklenburg)	10	21	41	NA	NA	NA	NA	NA

* Parentheses around ranking and accompanying asterisk indicates Effectiveness Ranking while in the N.C. House of Representatives.

the legislature's Special Committee on Prisons.

Then, when Blue tapped her as chair of the House Education Committee, she says she devoted herself to mastering education issues. "I was hoping they'd let me out on good behavior, but there's as little consensus on what to do about education and education reform as there is about criminal justice reform." Still, Barnes says, effectiveness in the legislature is about building consensus on tough issues. She sees this as one of her strengths.

Other notable showings by women in this year's rankings are the two highest-ranking first-term Senators, Leslie J. Winner (D-Mecklenburg) and Elaine F. Marshall (D-Harnett). Senators Winner and Marshall ranked 21st and 22nd, respectively. In the House, four women ranked in the top 20—Rep. Barnes at 8th; Ruth M. Easterling (D-Mecklenburg) at 16th; Speaker Pro Tempore Marie W. Colton (D-Buncombe) at 18th; and Karen E. Gottovi (D-New Hanover), now in her second term, at 20th. Rep. Carolyn Russell (R-Wayne), also in her second term, tied for the biggest gain in effectiveness in the House. She moved up to 45th from a tie for 97th place.

"Republicans don't chair major committees

Table 2. Effectiveness Rankings of the Top 10 Members of the 1993 General Assembly — N.C. House of Representatives

Name of Representative	Effectiveness Ranking in 1993	Previous Effectiveness Rankings (Where Applicable)						
		1991	1989	1987	1985	1983	1981	1979
Blue, Daniel T., Jr. (D-Wake)	1	1	6	6	7	8	30	NA
Nesbitt, Martin L., Jr. (D-Buncombe)	2	4	12	5	13	21 (tie)	65	NA
Miller, George W., Jr. (D-Durham)	3	3	3	4	4	4	4	9
Hackney, Joe (D-Orange)	4	5	9	7	10	15	60	NA
Fitch, Milton F., Jr. (Toby) (D-Wilson)	5	8	23	56 (tie)	79	NA	NA	NA
Diamont, David H. (D-Surry)	6	2	1	18	16 (tie)	18 (tie)	39	23 (tie)
Michaux, H. M., Jr. (Mickey) (D-Durham)	7	9	15	15	24	NA	NA	NA
Barnes, Anne C. (D-Orange)	8	13	21	20	28 (tie)	49	NA	NA
Ramsey, Liston B. (D-Madison)	9	12	11	1	1	1	1	3
Hunt, John H. (Jack) (D-Cleveland)	10	19	36	8	12	12 (tie)	12	57 (tie)

"REPUBLICANS DON'T CHAIR MAJOR COMMITTEES AND FREQUENTLY DON'T FARE AS WELL IN THE RANKINGS, SO I WAS SURPRISED AND PLEASED. IF YOU GO UP THERE AND WORK HARD, I THINK THAT'S RECOGNIZED BY PEOPLE."

—REP. CAROLYN RUSSELL (R-WAYNE)

and frequently don't fare as well in the rankings, so I was surprised and pleased," says Russell. "If you go up there and work hard, I think that's recognized by people." Russell says she also tried to put the state's interests ahead of partisan politics, which probably helped her ranking. And Russell offers the Republican slant on resilience. "When your bills get stolen or eaten or whatever happens to them up there, you've just got to keep on trucking," she says.

The 1993 session also marked the highest number of African-Americans (25) serving in the General Assembly, and this increase was accompanied by greater effectiveness. In the House, Speaker Daniel T. Blue Jr. (D-Wake) maintained his first place ranking, and both Milton F. "Toby" Fitch Jr. (D-Wilson) and H. M. "Mickey" Michaux Jr. (D-Durham) moved up *within the top 10*, ranking 5th and 7th, respectively. In the Senate, Lee broke into the top 10 at 9th, up from 18th in 1991. No other black senator has ever ranked that highly. The senator making the largest gain in effectiveness is also African-American, Frank W. Ballance Jr. (D-Warren), who moved up from 37th to 11th.

"Almost every black legislator gained in this year's rankings," notes Coble. "Single-member districts are helping African-Americans build up longevity, and the Speaker of the House is giving blacks important leadership roles. These two trends lead to a third—increased effectiveness, especially in the House."

Rep. Pete Cunningham (D-Mecklenburg) says of Blue, "He has given more opportunities to people who have leadership ability, but who never had the opportunity."[9] Cunningham, vice-chair of the Legislative Black Caucus, moved up from 87th to 52nd in the rankings after Blue named him Insurance Committee chair and Finance Committee vice chair.

The Center's rankings are based on surveys completed by legislators themselves, by registered lobbyists based in North Carolina who regularly work in the General Assembly, and by capital news correspondents who cover the legislature every day. These three groups were asked to rate each legislator's effectiveness on the basis of participation in committee work, skill at guiding bills through floor debate, and general knowledge or expertise in specific fields. The respondents also were asked to consider the respect the legislators command from their peers, the political power they hold, and their ability to sway the opinions of fellow legislators.

Legislative Shakeup Leads to Power Shift

Many high-ranking legislators left after the 1991–92 session, which led to changes in both the House and Senate. In the Senate, three of the 10 most effective members in 1991 did not return, and half of the new top 10 are there for the first time. Among the top 10, Sen. Roy A. Cooper III (D-Nash), who chairs the Judiciary II Committee, moved up the most, from a tie for 23rd in the 1991–92 rankings to 6th in the current session.

The House of Representatives also lost three of its most effective members after the 1991–92 session, making room for three new faces in the top 10. Two of those "new" faces belong to veterans making comebacks—former Speaker Liston Ramsey (D-Madison) and Rules Commit-

Rep. David Flaherty Jr. (R-Caldwell) became the latest rising Republican star to exit when he decided to enter the local district attorney's race.

tee Chair John J. "Jack" Hunt (D-Cleveland). Both had been in the top 10 in 1987. The third newcomer in the House top 10 is Rep. Barnes.

Longevity of service was a key factor in obtaining a higher ranking in both the Senate and the House. The Center notes that senators who had served one full previous term moved up an average of nine notches this year, while second-term representatives moved up an average of 30 places in the rankings. Returning Democrats who had served more than one previous term in the House moved up an average of 14 places, and returning Republicans moved up an average of 18 places. "It helps to have the time to develop," says Barnes, who debuted at 49th in the 1983 effectiveness rankings and has moved steadily upward ever since.

Members of the *minority party*—in this case Republicans—usually have lower effectiveness rankings. But this year, the two members of the House who gained the most in the rankings (52 places) were both Republicans. Representatives David Balmer (R-Mecklenburg) ranked 33rd after the 1993 session, up from a tie for 85th, and Carolyn Russell (R-Wayne) ranked 45th this time, up from a tie for 97th.

Leakage at the top has been a persistent problem in achieving and maintaining high rankings among Republicans. Leading GOP lawmakers tend to move on to things other than legislative service. Of the 10 GOP lawmakers who have led their party in the rankings in either the House or the Senate since 1977, eight ultimately left the legislature. Rep. David Flaherty Jr. (R-Caldwell) became the latest rising Republican star to exit when he decided to enter the local district attorney's race for Caldwell, Catawba, and Burke counties.

"I've got a wife and two kids and I live 200 miles from here," says Flaherty, who moved from a tie for 89th in his first term to a tie for 25th in his third. "My wife says she didn't get married and have two kids to be a single parent." Still, Flaherty says he was pleased to have risen to the top of the House GOP ranks in only three terms. He credits his rapid rise to his legal training and the knowledge of people and process he gained through his father, David Flaherty Sr. The elder Flaherty was a former legislator and a cabinet member in the administrations of former Governors James E. Holshouser Jr. and James G. Martin.

Balmer decided to forgo a potential fourth term in the legislature in order to run for the 9th Congressional District Seat vacated by Rep. Alex McMillan. He lost in a primary runoff to former Charlotte Mayor Sue Myrick. So the Republicans are losing their top-ranked Republican in the House, Flaherty, and, in Balmer, one of two Republicans who made the largest gains in the rankings.

Other House members making large gains in the rankings were: Majority Whip James Black (D-Mecklenburg, up 51 places), Robert Hensley (D-Wake, up 46), Margaret Jeffus (D-Guilford, up 44), William Wainwright (D-Craven, up 42), and Lyons Gray (R-Forsyth, up 39). In the Senate, those who made the biggest gains are all Democrats: Frank W. Ballance Jr. (D-Warren, up 26 places), Roy A. Cooper III (D-Nash, up 17), and Clark Plexico (D-Henderson, up 16).

The highest-ranking *first-term* legislators in the House were Philip Baddour (D-Wayne, tied

for 25th); Richard Moore (D-Vance, at 40th), who left to run for Congress; and Brad Miller (D-Wake, at 41st). The highest-ranking first-term Senators were Leslie Winner (D-Mecklenburg) and Elaine F. Marshall (D-Harnett), at 21st and 22nd, respectively. All five top-ranking freshmen are attorneys.

Facing the First-term Challenge—and Winning

First-term legislators face three major challenges when they come to Raleigh: learning to play the legislative game; learning to win the legislative game; and containing the battle of the bulge under a constant bombardment of free food and drink. Most never get past lesson one during their first session.

Winner had a slight advantage here, since she already had worked as a paid consultant to the legislature on redistricting. "I guess I have an edge in that I did come in already understanding the process, so I didn't have as much of a learning curve," says Winner. "My lawyer training made me comfortable operating under a set of rules," she says. "I was able to comprehend the rules, able to read the bills and statutes and contribute in little constructive ways."

Winner says she also benefited by confidence placed in her by President Pro Tempore Basnight, who named her chair of the committee that put together the Senate's version of the $740 million bond package passed by the voters in November.[10] "It gave me the opportunity to be effective," says Winner. "If you don't have those opportunities, you can't be effective."

Another freshman female attorney, Elaine Marshall, finished just behind Winner in the rankings. "I think in some ways that body was hungry for some women lawyers," says Winner. "On those issues perceived to be women's issues, or family issues, I think it was very helpful to be a lawyer."

The 1993–94 ratings mark the ninth time the Center has undertaken such an effort. The first edition in 1978 evaluated the performance of the 1977 General Assembly. The response rate to this most recent survey continued to be very high. Seventy-two percent (86) of 119 House members responded (Rep. Raymond C. "Pete" Thompson died in April 1993, and his replacement was not named until after the 1993 session), as did 44 of the 50 Senators (88 percent), 168 of 350 legislative liaisons and registered lobbyists based in North Carolina (48 percent), and 17 of 33 capital news correspondents (52 percent). Thus, the overall rate of response was 57 percent.

"Confidence in this survey continues to be high," says Coble. "Traditionally, legislators themselves have the highest response rate, and the same was true this time. A record number of Senators responded, and the overall response rate reflects a strong belief that the survey is a valid measure of legislative effectiveness."

Center director Coble notes that 31 of the 170 members elected to the 1993 General Assembly will not return to the legislature next year, so the legislature's power structure will continue to change. "Some took other state jobs, some ran for higher office, some chose not to run for re-election, and some ran for re-election and lost," says Coble.

By the end of the 1993 session, three House members and one Senator had resigned their seats. Rep. Peggy Stamey (D-Wake) was appointed to the state Paroles Commission, and Rep. Peggy Wilson (R-Rockingham) left the General Assembly when she moved to Alaska. Rep. Judy Hunt (D-Watauga) and Sen. Ralph A. Hunt (D-Durham) were appointed to the N.C. Utilities Commission. In January 1994, Rep. Dan DeVane (D-Hoke) resigned to take a post as lobbyist for the N.C. Dept. of Transportation. Two legislators died during the February-March 1994 special session on crime—Sen. John Codington (R-New Hanover) and Rep. Herman C. Gist (D-Guilford)—and Rep. Pete Thompson died during the 1993 session.

In addition to Balmer, three other members of the General Assembly will not be returning in 1995 because they ran for a Congressional seat: Sen. A.P. "Sandy" Sands (D-Rockingham), Rep. Bobby Ray Hall (D-Lee), and Rep. Richard H. Moore (D-Vance). Sands won the Democratic nomination in the 5th Congressional District, while Moore defeated Hall and Jennifer Laszlo of Durham to capture the party's nomination in the 2nd Congressional District.

The effectiveness rankings are published as a supplement to *Article II: A Guide to the 1993–94 N.C. Legislature*, which was released in 1993. This book contains the following biographical and voting information for each legislator serving in the 1993–94 General Assembly:

- business and home addresses and telephone numbers;
- office room number and phone number at the legislature;

- party affiliation, district number, and counties represented;
- number of terms served;
- committee assignments;
- the number of bills sponsored and enacted into law in the 1991–92 session;
- individual votes on important bills in the 1991–92 session;
- occupation and education; and
- past effectiveness rankings (1981–1991).

Copies of *Article II: A Guide to the 1993–94 N.C. Legislature* and the supplement containing the **new effectiveness rankings** are available from the Center for $31.20 a set. Write the Center at P.O. Box 430, Raleigh, NC 27602 or call (919) 832-2839.

FOOTNOTES

[1] Paul O'Connor, "Press influences Raleigh rankings," *The Dispatch*, Lexington, N.C., April 19, 1994, p. 9A.

[2] "Rankings not definitive, but worthwhile," unsigned editorial, *The Daily Courier*, Forest City, N.C., April 12, 1994, p. 4A.

[3] As quoted in Blake Dickinson, "Biennial report gives legislators high marks," *The Chapel Hill Herald*, Durham, N.C., p. 1.

[4] As quoted in "Guilford legislators speed up," unsigned editorial, *High Point Enterprise*, High Point, N.C., April 6, 1994, p. 4A. In response, the editorial says, "While we agree that editorial policy isn't very scientific, the survey does correspond to the realities of the General Assembly power structure. Legislators who rank at the top hold important leadership posts and get things done. That's called effectiveness."

[5] For more on institutional changes affecting the president pro tempore of the Senate and the House speaker, see Ran Coble, "The Lieutenant Governor in North Carolina: An Office in Transition," *North Carolina Insight*, Vol. 11, No. 2–3 (April 1989), pp. 157–165, and Paul T. O'Connor, "The Evolution of the Speaker's Office," *North Carolina Insight*, Vol. 15, No. 1 (January 1994), pp. 22–47.

[6] In the legislative effectiveness rankings survey, the Center also asks respondents to name the most powerful legislative committees. The Appropriations and Finance committees consistently have ranked one and two respectively in both chambers. There has been some variation among the next four slots. For 1993, the most powerful Senate committees were: (1) Appropriations; (2) Finance; (3) Judiciary I; (4) Education/Higher Education; (5) Rules and Operation of the Senate; and (6) Judiciary II. The most powerful House committees were: (1) Appropriations; (2) Finance; (3) Education; (4) Constitutional Amendments and Referenda; (5) Judiciary I; and (6) Rules, Calendar, and Operations of the House.

[7] Danny Lineberry, "Hard work, friends aid ambitious lawmakers," *The Herald-Sun*, Durham, N.C., April 10, 1994, p. 18A. Barnes correctly notes that most recent rankings were based on the 1993 session of the General Assembly—before the February-March 1994 special session on crime. Still, criminal justice reform ranked high on the legislative agenda long before the crime session, and Barnes' expertise in this area almost certainly contributed to her eighth-place finish in the 1993 effectiveness rankings.

[8] For more on the evolving role of women in the General Assembly, see Betty Mitchell Gray, "Women in the Legislature: A Force for the Future," *North Carolina Insight*, Vol. 15, No. 1 (January 1994), pp. 2–21. The increasing clout of African-American lawmakers is discussed in Milton C. Jordan, "Black Legislators: From Political Novelty to Political Force," *North Carolina Insight*, Vol. 12, No. 1 (December 1989), pp. 40–58.

[9] As quoted in Foon Rhee, "N.C. Center ranks legislative power brokers," *The Charlotte Observer*, April 5, 1994, p. 5C.

[10] The voters ultimately authorized bonds for: the University of North Carolina system campuses, $310 million; the community colleges, $250 million; local water and sewer projects, $145 million; and the state parks system, $35 million.

MEMORABLE MEMO

13 Sandy move to #11, Wanda move to #4
14. Christine and Susan, Chris and Kathy occupy #16 and #15
15. John and Gina move to #17 and Area furniture move into #22
16. Jihad and Wallace move into #21
17. Ed and Frank move into #19

Action persons and responsibilities follow:

1. Ben Gibbs: Coordinate telephone changes and computer outlet (if necessary changes and LAN line installation in Room #3
2. Walter Morgan: Coordinate office moves with supplemental help from Depot if required
3. Grover Lewter: Coordinate office construction required
4. Susan Stanford: Maintain office telephone number changes in inte old numbers can be reassigned to new locations

Patience will be required of all to maintain the workload during this pe disruption. When completed, communication between functional area will be improved.

JAMES B. HUNT JR. GOVERNOR

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SAM HUNT SECRETARY

March 15, 1994

MEMORANDUM TO: Employees Central Unit, Equipment and Inventory Control

FROM: John M. Burns, Jr., Director
Equipment and Inventory Control

SUBJECT: Office Rearrangement

Due to additional employees in the Roadway Maintenance Unit it is necessary to give up the office currently occupied by Drew Harbinson. As a part of this move we will assume use of the Bridge Conference Room for an office. The Unit will take this opportunity to realign office assignments to have spaces reflect Unit organization more closely.

The order of events to accomplish the required moves follows with all events completed as expeditiously as possible.

ORDER OF EVENTS

1. Telephone in Frank's trailer
2. Frank/move to trailer (temp) From #3
3. Ed move From #3 to his old office #25 (temp)
4. Drew move to #3 Jim Parker move to #9
5. Close in #15 with wall moved approximately 3 feet west and move wall between #15 and #16
6. Open door between #13 and #23 close doors between #12 and #23, #14 and #15, #16 and #17
7. Henry move to #6
8. Fuel (Frank Brown & Kim) move to #13
9. Gary and Billy Capps move to #12
10. Ben move to #8, Bobby Bradley move to #5
11. Bobby Sloan move to #14
12. Move furniture in #11 to hall outside #22 or store in #21

When a state employee gets a new office, how many co-workers have to move? If you guessed 22, you win a free copy of Reinventing Government. *It's all in the name of organizational efficiency. And once the folks at DOT get their work flow problems straightened out, they're going to tackle traffic flow between Greensboro and Durham on Interstate 85. As they say in the memo, "patience will be required." Meanwhile, we'll be looking for more memorable memos. Anonymity guaranteed.*

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