

Hunting mosquitoes

The State May Be Looking in the Wrong Swamps

“You cannot imagine what it is like, getting out of your car and literally breathing mosquitoes. I’ve been places where you could wave your hand behind you and feel them hitting your hand like rain.”

—Bob Pittman
State Division of Marine Resources
Morehead City

by Tom Dillon

Many residents of coastal North Carolina, like the state official quoted above, view the prevalence of mosquitoes as one of the serious obstacles to economic growth in the region. They heartily support North Carolina’s mosquito control program, a relatively little-known state service. That program provides money to all regions of the state, but it operates predominantly in 38 eastern and coastal counties. Last year, according to the Department of Human Resources, more than 96 percent of all the state money spent fighting mosquitoes went to those 38 counties, which stretch from the coastline as far west as Robeson and Halifax. Those 38 counties were the ones pinpointed in a 1957 study as being particularly vulnerable to mosquito-borne disease outbreaks. In them, county health departments pay particular attention to the job of mosquito control. The program is popular with both citizens and with many legislators who live in the area. “Anybody who opposes this program hasn’t dealt with the business end of a mosquito,” says State Sen. Harold W. Hardison of Lenoir County.

But the mosquito control program, following two straight years of budget overruns and the criticism of a number of environmental scientists, has come under increasing scrutiny. Large-scale drainage of swamp land may be disturbing the salt water marshes used as shellfish breeding grounds, critics say, as well as giving farmers and developers free state aid in reducing water tables to reclaim land. Equally as important, according to some insect scientists familiar with the program, the program is not operating to attack the most serious insect problem in the state, that of the salt marsh mosquitoes—*Aedes sollicitans* and *Aedes taeniorhynchus*. Faced with stringent federal controls over marsh draining to fight mosquitoes, the state and local governments have simply given up and turned their

attention to less serious freshwater mosquito problems—in effect ignoring science and new ways of fighting mosquitoes.

Even some people connected with the mosquito control program acknowledge that they often do not have the data necessary to insure that their work will in fact help solve mosquito problems. The state needs a more scientific approach to the problem, state entomologist Thomas T. Blalock said last fall. “We need to know what species is breeding, exactly where it is breeding, and how many mosquitoes are being bred.” Right now, he said, that information is often unavailable. He cited the case of a man near a swamp who thought the swamp was breeding mosquitoes. The source of the problem turned out to be water-filled containers in the man’s own backyard.

In North Carolina, modern mosquito control dates from the 1957 report of the Salt Marsh Mosquito Study Commission, a group established by the General Assembly to look at ways of lessening the mosquito problem on the coast. In its report, the commission suggested ditching the marshes to speed the tidal flux in them—to, in effect, deprive mosquito eggs of the moisture needed to help them hatch. In the years following the report, thousands of acres were ditched. By 1967, according to figures compiled for the University of North Carolina’s Water Resources Institute, more than 14 percent of the state’s 159,000 acres of salt marsh were laced with parallel ditches designed to eliminate mosquito-breeding habitat. In some counties, up to 90 percent of the marshland has been ditched.

Scientists differ on the effect of this ditching. In 1973, two researchers from North Carolina State University, Drs. Kenneth L. Knight and Richard N. LaSalle, questioned in a research paper whether the marsh drainage was working. Other techniques seemed a better way of controlling mosquitoes. Others say the ditching worked but

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could have been much less extensive than it was. Still others, particularly those concerned with marine fisheries, question the effect of the ditching on marsh life. "The marsh is the start of the food chain," said one scientist concerned with the ditching, "and it's important to save it." At the least, said critics, the environmental effects of marsh draining should be studied. It is this last concern that has been paramount in getting marsh drainage stopped. Since 1969, the U.S. Army Corps of Engineers has required environmental impact statements of those interested in draining marshland. State and local officials, according to Corps representatives in Wilmington, have made no effort to comply. They simply stopped the ditching, and accelerated what has come to be known as "upland drainage"--freshwater mosquito control. Mosquito control officials say the changeover was for other reasons as well--"We had already finished ditching our marshes," said Charles McCotter, health director in Pamlico County. In the last two years, the Corps has received only one application to drain a marsh for mosquito control--and it turned that one down. In the meantime, upland drainage, over which Corps officials say they have only limited jurisdiction, has grown by leaps and bounds. Last year, more than 70 percent of the state's mosquito control budget went for such work.

Large draglines or hydraulic backhoes are the instruments of mosquito control in the state's eastern counties today. These machines are used to dredge creeks or dig drainage ditches that carry runoff from inland areas, which includes farms, woodlands and areas slated for development. Officials do not deny that the work aids in lowering inland water tables. Typically, says McCotter, the Pamlico County director, a farmer will dig ditches to the end of his fields and allow the water to collect there. Then the county comes in and digs a large ditch to carry away the collected water. The ditching is necessary to prevent the accumulation of stagnant water near farms, says McCotter, and to prevent the fouling of septic tanks in developed areas. And it has been useful. "Before they came in here, there were some places where it was almost impossible to get septic tank approval," said Robert Whitehead, a resident of Riverdale, a small community near New Bern. Whitehead says ditching done through the program helped solve three community problems--mosquitoes, flooding and septic tank contamination.

Critics of the program do not deny the need for some public drainage work in eastern counties. "I'm not against draining land and giving a better quality of life," said Dr. Charles S. Apperson, an entomologist at North Carolina State University.

But, say Apperson and others, the program has moved into many other areas besides mosquito control since the marsh drainage ended. And that means that money originally earmarked for mosquito control is being used to solve other problems--a diversion that appears to violate the state's dictum that mosquito control money be spent "exclusively for mosquito control." The problem has been especially noticeable the last two years, because the large amount of ditching work has driven costs considerably above the state budget allocation. In fiscal 1977-78, the state mosquito control program had to be supplemented with \$200,000 in receipts from North Carolina's tuberculosis sanitariums. That money made up almost one-fourth of the overall \$881,000 the state spent on mosquito control in fiscal 1977-78. The costs of the program for the current fiscal year are expected to exceed the budgeted figure of \$687,163 by an amount in the neighborhood of \$200,000.

Apperson says the program is out of balance--that some of the money used for ditching should go to chemical and newer biological methods of mosquito control. Such a change would likely reduce the cost overrun. The state will pay two-thirds of the cost of the ditching projects, compared to only one-half the cost of spraying or biological control procedures. The change could also allow the state to move toward work with biological controls that upset mosquito breeding without the pollution problem accompanying chemical controls. One such control mechanism, a fungus that destroys mosquito larvae, is slated for field testing in North Carolina this year.

Beyond that, say Apperson and a number of other scientists, there is a serious need for better sampling of mosquito types and breeding locations. Apperson as well as some officials in the mosquito control program contend such surveillance will show that the program should never have been shifted away from the marshes in the first place. Salt marsh mosquitoes are more vicious than their freshwater counterparts, said Apperson, as well as more likely to carry diseases such as encephalitis. Apperson says marsh ditching helped with the salt marsh mosquito problem, but did not end it. Said Dr. Richard Axtell of State, "There is clearly an absence of prior investigation" of mosquito populations sufficient to justify the upland drainage. Another scientist, who asked not to be quoted by name, said, "There is some problem in freshwater areas, but it doesn't justify the massive amount of work going on. The problem is salt marsh mosquitoes."

Critics of the program point to the experiences and policies in several other states in calling for changes in the North Carolina program. South

Carolina considers ditching and dredging too expensive a control method for mosquitoes, according to a spokesman for the state's insect disease control program, as well as too open to political pressure exerted in favor of specific drainage projects. North Carolina officials say they attempt to be as fair as possible in deciding which projects get done first, considering such factors as the number of people affected by a dredging project, the height of the water table, and the amount of natural runoff, before attacking a project. Nevertheless, North Carolina's mosquito control program has been charged on occasion with benefiting certain groups more than others. In urban New Hanover County, a 1973 study of those benefiting from mosquito control work produced a list that included land developers, realtors and even one member of the county's planning commission.

New Jersey has undertaken a program of selective marsh draining and other, milder measures of water management to control mosquitoes. Dr. Joseph K. Shisler of Rutgers University said it is possible to fight salt marsh mosquitoes through marsh draining without causing environmental problems on the marsh and without antagonizing the Corps of Engineers. "We have good rapport with the Corps and with environmentalists here," said Shisler, "because we've taken the time to explain to them what we're doing." Shisler says he does not recommend parallel ditching, of the type done in North Carolina's marshes, as a means of mosquito control. But some ditching is permissible, he said. And in any case, environmental damage to the marshes is not ended if a state, as North Carolina has done, simply moves its dredging operations to the marshes inland. Fresh water draining through the inland mosquito control ditches can still damage the marsh by lowering the salinity needed in shellfish breeding grounds. In fact, it is this final criticism which may in the long run have the most effect on North Carolina's upland drainage mosquito control program. "If drainage drops the salinity down, shrimp and other shellfish are driven out in open water where they are easy prey for predators," said Dr. Howard Marshall, an Environmental Protection Agency scientist in Atlanta. Marshall, as a student in Chapel Hill, did much of the original research on the effect of drainage projects on marine life in North Carolina's marshes. "I'm not opposed to upland drainage, as long as you know what you're doing," Marshall said. But he said previous experience in North Carolina, at Rose Bay on Pamlico Sound, has shown upland drainage to damage marsh nursery areas. "The whole question of upland drainage should be looked at thoroughly," he said.

Jerry C. Perkins, who oversees the mosquito control program for the Division of Health Services, said the division is attempting to find out more

about the effect of its upland drainage. The division has recently asked the North Carolina Wildlife Resources Commission to evaluate the environmental effects of the drainage projects. But that appears to be only the first of several needed steps. Entomologist Apperson cited these priorities for the mosquito control program in a recent letter to Perkins: more work on salt marsh mosquitoes; better mosquito surveillance to support the need for upland drainage projects; adequate management and design for the entire state mosquito control effort; and more entomological input into the county drainage projects. And Perkins agreed with most of the suggestions. "There has been a concern on the part of the state that we need more entomologists and more technical people," he said.* He said the state is "woefully behind" in documenting the need for mosquito control in specific areas.

That finding will probably surprise few people on the coast---residents or tourists---when mosquitoes begin returning to the area this summer. Surveys by Axtell and others in 1973 found that coastal residents considered mosquitoes, though they did not seem as numerous as in the 1950s and early 1960s, to be a continuing problem---bothersome as well as an economic drawback. Most property owners felt their property would increase in value with better control of mosquitoes and other biting insects. Since 1973, the opinions seem to have changed little. In the Hobucken area of Pamlico County, said one resident, mosquitoes were still in evidence in December last year, prompting consideration of a new spraying program for this summer. Said Hardison, the Lenoir County senator, "I'm still getting complaints from all up and down the coast about mosquitoes."

Typically, said Pittman, the marine resources official, the first realization an urban North Carolina resident will have of the coastal mosquito problem is when he decides to spend a week of late summer near one of the marsh areas. "Let's say you've seen a cottage in April and decided to rent it for later in the summer," he said. "It's entirely possible you'd get there, take one step outside the car and then decide to leave." □

*The Division of Health Services asked for an additional \$1.2 million to fund the mosquito control program during the 1979-81 biennium. Some of those additional funds would have been used to hire an entomologist, an entomologist technician, an environmental engineer, and two engineering technicians. The budget request submitted by the Department of Human Resources to the Governor and the Advisory Budget Commission included only an additional \$400,000 for the next two years, an amount that approximates the amount of the program's budget overruns during the last two years.