ANNUAL REPORT 1999

CITY OF NEW ORLEANS MOSQUITO AND TERMITE CONTROL BOARD

DIRECTOR'S REPORT

1999 ANNUAL

EDGAR BORDES

This is a summary of the 35th Annual Report of the New Orleans Mosquito and Termite Control Board. As we complete the fourth year of our termite program, we have seen major progress in combating this citywide problem. This year was our second year of the USDA-ARS termite project, named "Operation Full Stop." Part of this project involves baiting 15 square blocks of the French Quarter, characterized last year, and a major research project covering all of Armstrong park (c.15 colonies). Additionally, we have been conducting contractual research for several companies including Bayer (imidacloprid), Rhone-Poulenc (fipronil), Dow Agrosciences (hexaflumuron) and American Cyanamid (chlorfenapyr).

The Armstrong Park project included the collection and release of over 25,000 dyed termites. This is part of a process called triple mark-recapture, and is used to determine colony size, both numerically and geographically. Included in this report are charts and data on the many aspects of the Park project.

Another part of the USDA project was the initiation of the two-year Louisiana State Termite Survey. Over 580 pest control operators are participating by sending us

termite samples. This is the first such survey, and will be used as a prototype for a national survey.

The termite staff gave numerous presentations throughout the United States on our research projects, which have worldwide implications.

Fall saw the end of our encephalitis season, with two mid-summer nearby human EEE cases and no deaths. Southern Louisiana had an unusually high incidence of EEE horse and emu cases (nearly all fatal). Last year there were 17 human cases of SLE in Louisiana.

This brings us to another very unusual encephalitis event this year– West Nile virus in the Northeast. This virus has never been documented in the Western Hemisphere. Very similar to SLE, the virus is common in northern Africa and Western Europe. Most of the human cases were in New York and New Jersey. Most of the cases were in New York and New Jersey, with at least 31 confirmed and 25 probable cases (7 deaths). In 1998, the Assistant Director was a USAID consultant for Romania during its first-ever outbreak (over 100,000 human cases likely).

We were fortunate that mosquito populations were below normal as drought conditions eliminated breeding sites for much of the year. Our primary pest species was *Aedes albopictus*, with populations peaking in July.

Our buck moth survey, begun in 1995, continued this year, with very heavy infestations of caterpillars detected in the 200 tree survey. This appears to be the peak of what is possibly a five-year cycle. This year we also initiated a pheromone trap survey for the male buck moths, with 920 moths collected in 24 traps at 8 sites between December 1 and February 1.

This year we were very fortunate to have had most of our fleet replaced. Many of the previous vehicles had over 160,000 miles on them. Also, we replaced our aging ULV spray machines. With our preventative maintenance program, this equipment should last another 10-15 years.

One very important staff addition was Dr. Janet McAllister, formerly of CDC Atlanta. Janet is a nationally recognized scientist in mosquito control who will be an important addition to our Termite Division.

We also made significant progress in increasing the hiring rates in our Inspector and Specialist series, and were able to effect several promotions for our staff. We are constantly working to increase the very low salaries of most of our staff.

Detailed reports of the City of New Orleans Mosquito and Termite Control Board are included in the body of this report

ASSISTANT DIRECTOR'S REPORT

MIKE CARROLL

Heretofore, this report has been titled "Entomological Report." Operations at the New Orleans Mosquito and Termite Control Board have changed considerably since the first Entomological Report in 1965. In June of that year, the 23 New Jersey light traps averaged 936 females per light trap, 53% of which were the voracious day time biting salt marsh mosquito *Aedes sollicitans* (one or two percent is considered high now).

In 1965 the Entomologist had to be an Indiana Jones type, always in the field, in hip boots, marsh buggies, helicopters and constantly swatting mosquitoes. Our board members and colleagues are aware of the many new challenges we have taken on. And thus, this report now gives a broader view of the activities of the Assistant Director. Most of the information previously included in this report will now appear in the "Field Operations" report.

This year began our second year on the USDA-ARS termite project. We continue to make very good progress with the several operational research projects our staff has undertaken. These include the Vieux Carre baiting project (with USDA and LSU), the Armstrong Park colony biology project (with the USDA, LSU and the University of Florida) and several termite control projects with trees and buildings involving several cooperators.

This year we had the extreme fortune to receive a substantial amount of replacement equipment. Many of our vehicles were 20 years old, and several averaged over 160,000 miles. We are most grateful to the administration for supplying us with 20 new vehicles and seven new ULV truck mounted adulticiders. All of our operations, and most importantly, Rodent and Vector Control, have field equipment that should last another 10-15 years.

We were fortunate this year to employ Dr. Janet McAllister, formerly of CDC Atlanta. Janet is a nationally recognized scientist in mosquito control who will be an important addition to our Termite Division. Janet helped develop new, state-of-the-art insecticide susceptibility tests, which we are now using in our program.

We made some progress in increasing the hiring rates in our Inspector and Specialists series, and were able to effect several promotions for our staff. We are constantly working to increase the very low salaries of most of our staff.

Fall saw the end of our encephalitis season, with two previous nearby human EEE cases (mid-summer) and no deaths. Southern Louisiana had an unusually high incidence of EEE horse and emu cases this year (nearly all fatal). Last year there were 17 human cases of SLE in Louisiana.

This brings us to another very unusual encephalitis event --West Nile virus in the Northeast. This virus has never been documented in the Western Hemisphere. Very similar to SLE, this virus is common in northern Africa and Western Europe. In 1998, I was a USAID consultant for Romania during its first ever outbreak (over 100,000 human cases likely).

Most of the human cases were in New York and New Jersey, with at least 31 confirmed and 25 probable cases (7 deaths). We have been in contact with CDC and hope to have a WNV surveillance program in place by next season.

FIELD OPERATIONS --

STEVE SACKETT

We were fortunate to be able to purchase seven Grizzly ULV fogging units this year to replace our 22-year old Lecos that have served us so well. These new units have the ability to use a variable flow chemical output which is regulated by vehicle speed and can operate up to 20 mph when conditions will allow. A check of the droplet spectrum revealed a very uniform size, well within the chemical label requirements. Mounted on new F-150 Ford trucks, these rigs should give us good service for years to come.

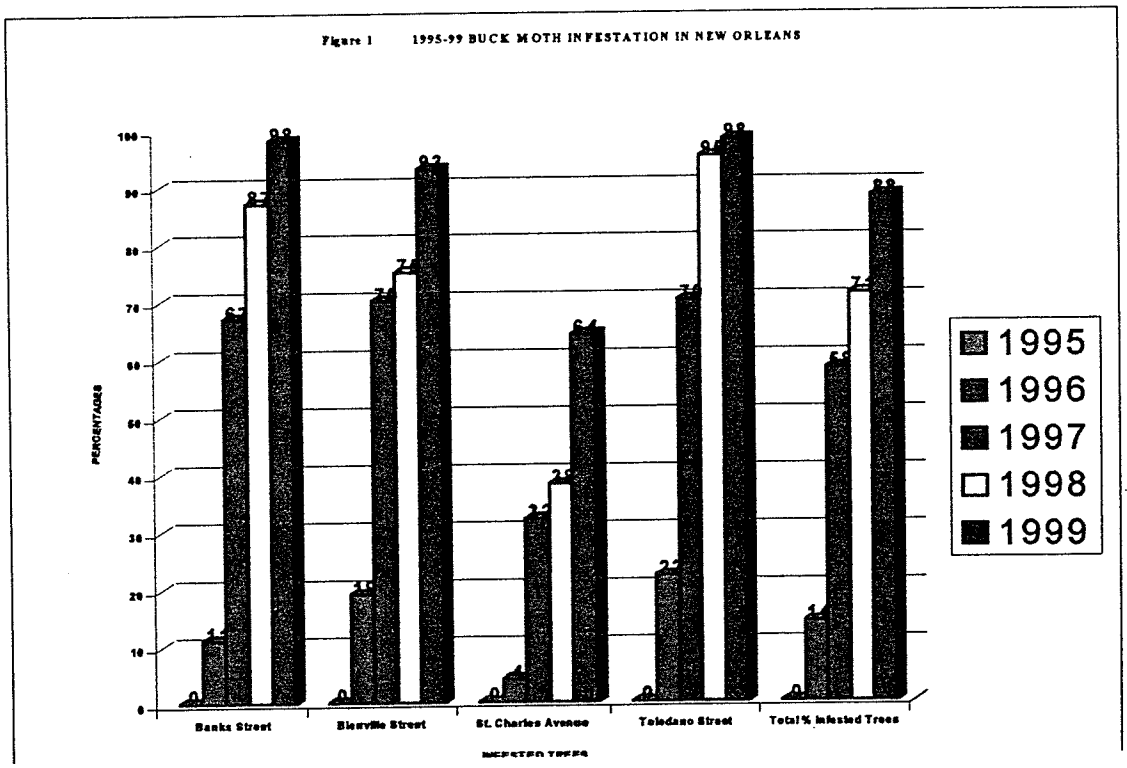
We were also fortunate that mosquito populations, for the most part, were below normal as drought conditions eliminated breeding sites for much of the year. *Aedes albopictus* was again our primary pest species, with populations peaking in July. Telephone complaints during that month were significant as the public's fear of an encephalitis outbreak was heightened by the number of container-breeding mosquitoes infesting the neighborhoods of New Orleans. Back yard inspections, hand fogging, and ground ULV treatments gave temporary control in many areas, but the drought conditions which returned in August gave us the best relief. Other species of mosquitoes, such as *Culex salinarius* and *Ae. sollicitans*, also required ULV applications, but their populations were generally below average for the year.

Studies on the buck moth, *Hemileuca maia*, were initiated by our agency in 1989 at the request of the City Council to address the problems of stinging caterpillars and defoliation of our oak trees. With funding from the U.S. Forest Service and assistance from the New Orleans Parks and Parkway department, buck moths were significantly reduced during the treatment period of '89-'92. In 1995 we began an annual survey of 200 oak trees in 4 areas of the city to monitor for the presence of buck moth caterpillars. Table 1 illustrates the percentage of the trees that were found to be positive for caterpillars. Data from St. Charles Avenue has not been included as those trees have been treated since the study was started. No federal funds have been available since 1992 and buck moth populations have been steadily rising since 1995.

TABLE 1.

BUCK MOTH CATERPILLAR INFESTATION % POSITIVE OAK TREES

	BANKS	BIENVILLE	TOLEDANO	AVERAGE
1995	0	0	0	0
1996	8	8	44	19
1997	67	70	70	69
1998	87	75	95	85
1999	98	93	98	96



In addition to monitoring trees for caterpillars, we began a trapping program in 1999 for male buck moths using pheromone baited sticky traps. A total of 920 moths were collected in 24 traps at 8 sites throughout the city during the time period of December 1, 1998 to February 1, 1999. Adult flight activity was in full swing when the study was initiated, but no moths were collected when the study ended. It is hoped that information from the adult trapping will give us some insight as to the severity of the caterpillar problems that may arise from the spring hatch.

Table 2

MOSQUITO SPECIES COMPOSITION (%) FROM NEW JERSEY LIGHT TRAPS

Culex salinarius	45
Culex restuans	18
Aedes vexans	18
Anopheles crucians	7
Anopheles quadrimaculatus	2
Culiseta inornata	2
Aedes sollicitans	2
Uranotaenia sp.	1

Other species less than 1 % each

1999 NEW ORLEANS RAINFALL CHART

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
NO WATER PLANT	2.59	0.00	2.20	0.00	3.33	11.59	2.92	5.21	3.36	3.31	0.00	2.52	37.03	3.09
TULANE UNIV.	4.90	0.18	3.54	0.00	5.06	16.96	3.29	5.80	4.72	3.90	0.34	4.74	52.44	4.37
S&WB	2.67	0.08	4.98	0.00	4.77	9.11	2.54	5.34	4.41	4.06	0.16	2.69	40.80	3.40
ALG WATER PLANT	2.72	0.11	3.69	0.00	5.34	7.13	2.88	4.17	4.78	3.46	0.20	2.72	37.20	3.10
DPS 1	2.99	0.11	5.92	0.02	5.99	11.69	1.49	4.58	4.96	3.32	0.09	3.41	44.57	3.71
DPS 3	1.74	0.28	2.88	0.03	4.68	11.47	3.13	6.52	3.03	3.48	0.27	2.55	40.06	3.34
DPS 4	3.01	0.53	3.49	0.05	4.45	10.20	2.65	4.30	2.97	3.71	0.11	2.09	37.56	3.13
DPS 5	1.85	0.31	3.89	0.03	4.28	6.43	1.87	2.70	5.31	2.45	0.16	2.21	31.49	2.62
DPS 6	3.87	0.49	5.96	0.04	5.08	15.46	7.05	5.63	3.22	5.57	0.36	2.84	55.57	4.63
DPS 12	1.75	0.60	4.98	0.00	3.37	12.26	2.59	3.68	2.72	3.38	0.14	3.28	38.75	3.23
DPS 13	2.20	0.17	3.37	0.07	6.69	7.74	3.50	2.67	5.79	4.15	0.05	2.71	39.01	3.25
DPS 14	3.16	1.11	4.26	0.00	4.06	12.99	1.59	0.23	4.13	4.42	0.10	2.59	38.66	3.22
DPS 15	3.90	0.75	3.07	0.00	3.95	8.83	3.42	3.84	3.99	4.46	0.10	0.00	36.31	3.03
DPS 16	3.40	1.02	2.68	0.00	6.71	8.39	2.24	1.87	3.68	5.23	0.00	2.69	37.81	3.15
UNO	4.95	1.01	8.41	0.00	5.25	6.28	1.47	2.86	2.89	6.16	0.28	4.37	43.93	3.66
106 YR. AVERAGE	4.70	0.45	5.18	4.90	4.90	5.37	6.49	5.89	5.58	3.10	3.61	4.71	54.88	4.57
1999 AVERAGE	3.06	4.63	4.18	0.03	4.86	10.37	2.84	3.97	4.00	4.07	0.16	2.76	44.93	3.74
1998 AVERAGE	20.70	5.03	9.28	4.12	0.74	3.28	5.02	7.59	26.90	0.99	3.65	1.74	89.04	7.42
1997 AVERAGE	4.38	3.76	3.50	5.43	5.48	4.84	4.30	1.92	0.52	1.21	7.26	1.90	44.50	3.71
1996 AVERAGE	3.62	2.55	4.47	4.92	2.41	5.90	7.27	5.82	3.11	0.97	3.02	4.66	48.62	4.05
1995 AVERAGE	3.53	4.96	9.79	5.17	20.91	1.98	7.67	2.99	1.20	2.06	2.99	3.60	66.84	5.57
DAYS OF RAIN	6	3	4	1	9	14	22	13	8	6	3	8	76.00	6.08

AVIATION OPERATIONS --

JOSEPH RIEDL

This year started off as usual. Before the spraying season, the public was notified of our continued intentions to adulticide for mosquito control in Orleans Parish. A new plan of operations was submitted and approved by the Federal Aviation Administration. Renewal forms were filed and insurance acquired. Flight physicals were taken and cholinesterase checks were made. Pilot proficiency was maintained. Surveillance flights were conducted. The airplanes were ready when needed. This conforms with preparations made every year.

Aerial treatments were conducted using the Britten-Norman (twin engine) Islander and the Grumman (single engine) AG-Cat. Malathion at a rate of three ounces per acre was dispensed from the Islander. Scourge mix was sprayed at one ounce per acre from the AG-Cat. Aircraft spray missions increased this year with an increase in mosquito activity, particularly in the areas extending from New Orleans East to Fort Pike. The airplanes were also flown on surveillance, inspection, test and proficiency flights.

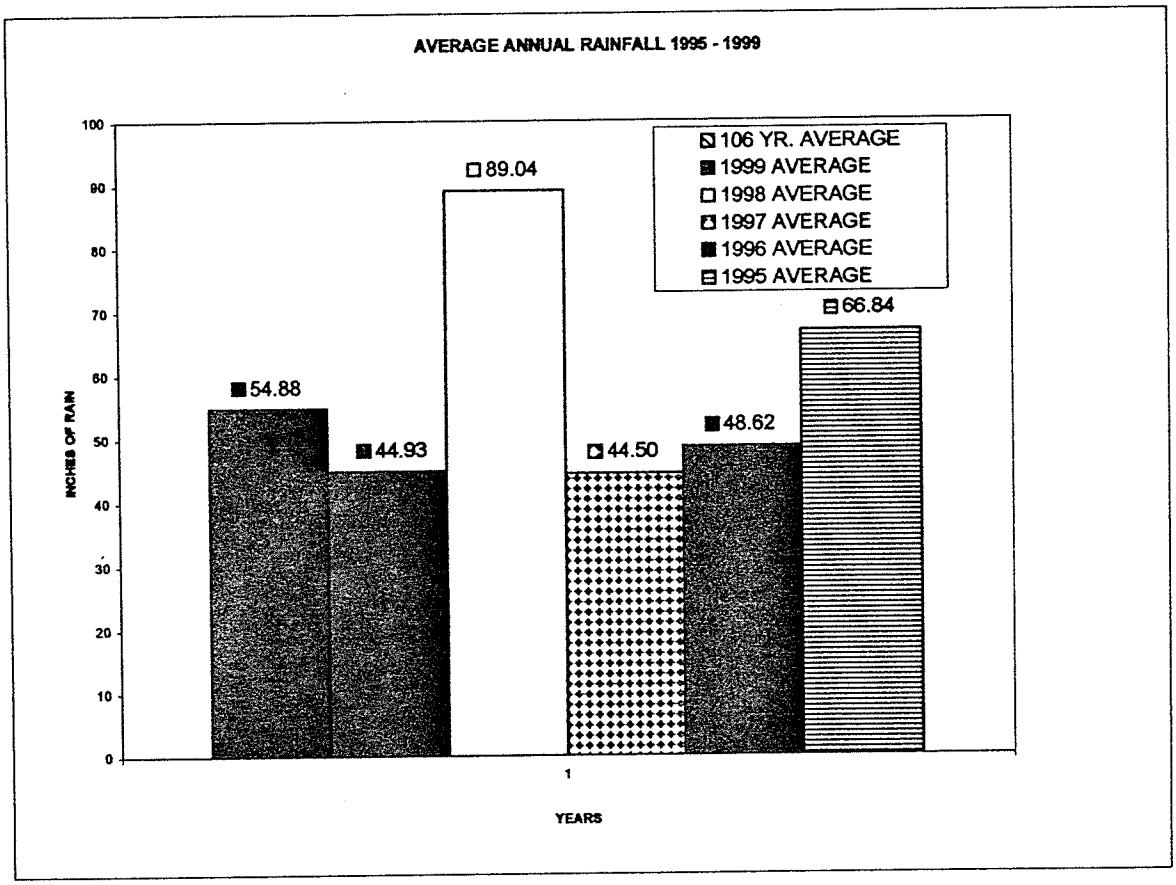
At the hangar, in our maintenance shop, work continued throughout this period. The required F.A.A. annual inspections for the airplanes were completed during the off season. Spray systems on the planes were cleaned, checked and calibrated. The machines were washed after each spray flight. The Islander and the Ag-Cat was polished during the summer. We complied with all airworthiness directives (compulsory maintenance procedures) on the aircraft.. Lubrication requirements were met. Preventive maintenance was accomplished. Radio problems were corrected. The hangar and ground support equipment was maintained.

Aircraft records and files were kept up-to-date. Manual revisions and inspection data was inserted as received. I renewed inspection authorization at the Gulf South Aviation Maintenance seminar. Also, my aviation applicators certification was renewed. Preparations are being made for the upcoming spray season.

SOURCE REDUCTION --

BROOKS HARTMAN

For most of 1999 the Source Reduction program was active with inner city projects S-2 and O-1 which are both located in New Orleans East. The O-1 area is located east of Jourdan Road, west of Downman Road, south of Lewis Road and north of Dwyer Road. The S-2 area is located east of Wright Road, west of Berg Canal, south of Lake Forest Boulevard and north of Idlewood Court. Both are extremely important as they lie within densely populated sections of the city and will be monitored during the coming years. Additionally, clearing of obstructions from storm drains and drainage pipes within existing source reduction areas in Orleans Parish was completed.



TECHNICAL SUPPORT
and PUBLIC EDUCATION--

JACK LEONARD

A new monthly report cover was created using the Canvas 5 drawing program and images from the digital camera. These covers will be printed in house on a DeskJet printer. This will be much cheaper than having the covers printed, and allow us to change the cover at any time.

ArcView maps of termite activity were made for the state Termite Initiative. These maps of 30 areas were revised several times, and it was necessary to have the program calculate the number of blocks, and the length of streets in these areas. This required me to learn several things about this program. ArcView is a very useful and powerful program, but I would not call it user friendly. Finally the ArcView files were converted to bitmaps, and copied to a CD-ROM so that others could print them.

ArcView maps were drawn of the Historic District Landmarks Commission areas. These will be used in the termite project. The areas mapped include the HDLC, Canal Street, and Central Business District landmark areas.

Hurricane Mitch deposited 7 inches of water at the Mosquito Control facility. Fortunately, most of the equipment in the Public Education Office was not on the floor and remained unharmed. The carpet, had to be replaced in the inspector's room, public education office, and training room. This required the disconnection and removal of all equipment from the public education office. The removal and reinstallation took about a week.

Three new laptop computers were purchased for use by the Termite Division and Public Education. These machines will allow us to update ArcView maps in the field and give presentations using Microsoft PowerPoint. With the slide scanner already purchased, we can use our large slide library, or images from digital cameras to create special presentations for any occasion. A portable LCD (Liquid Crystal Display) projector was also purchased for these presentations. The use of PowerPoint presentations will greatly reduce the amount of time and money spent on slides, cataloging, and duplication. The PowerPoint presentations can be duplicated with a mouse click, cataloged on the computer, and digital images can be customized at will.

Several PowerPoint presentations were created for the Director. The presentations utilized our new projector and laptop computer. The director was able to make changes to the programs just before the presentation began. This system is far superior to the slide presentations used in the past.

Older computers also required some work; Two Hewlett- Packard 266Mhz PII units had become so slow because of conflicts and partially removed programs that they were nearly unusable. The solution for these machines was to format the drives, and start over again. All data was archived on zip disks, and the units were erased and reloaded. Although this solution may seem severe, it is actually faster than trying to figure out what software conflicts are causing the problem. It may be reasonable to go through this procedure every two years or so or whenever the performance of the machine warrants it. One of these machines was moved to the Rodent Control Division.

The video-editing computer has been upgraded in order to solve several problems with the video capture card. The old card, made by Hauppauge Inc., is no longer supported and does not work well with the newer operating systems. The operating system was upgraded to take advantage of increased limits on file size. The upgraded system consists of the existing 400Mhz PII computer with a new Miro DC30 Plus capture board. This board is fully supported by the company and works well with the Windows 2000 operating system. The two SCSI drives used for video were striped as a raid set to increase the output. The system now captures video at 704x480 resolution at up to 7MB/second. This is far superior to the old system. A 27GB ide drive was also added to increase storage for video files.

Video of termite swarming and damage was edited and copied to betacam tapes in anticipation of the swarming season. These tapes will be available to the news media when swarming starts.

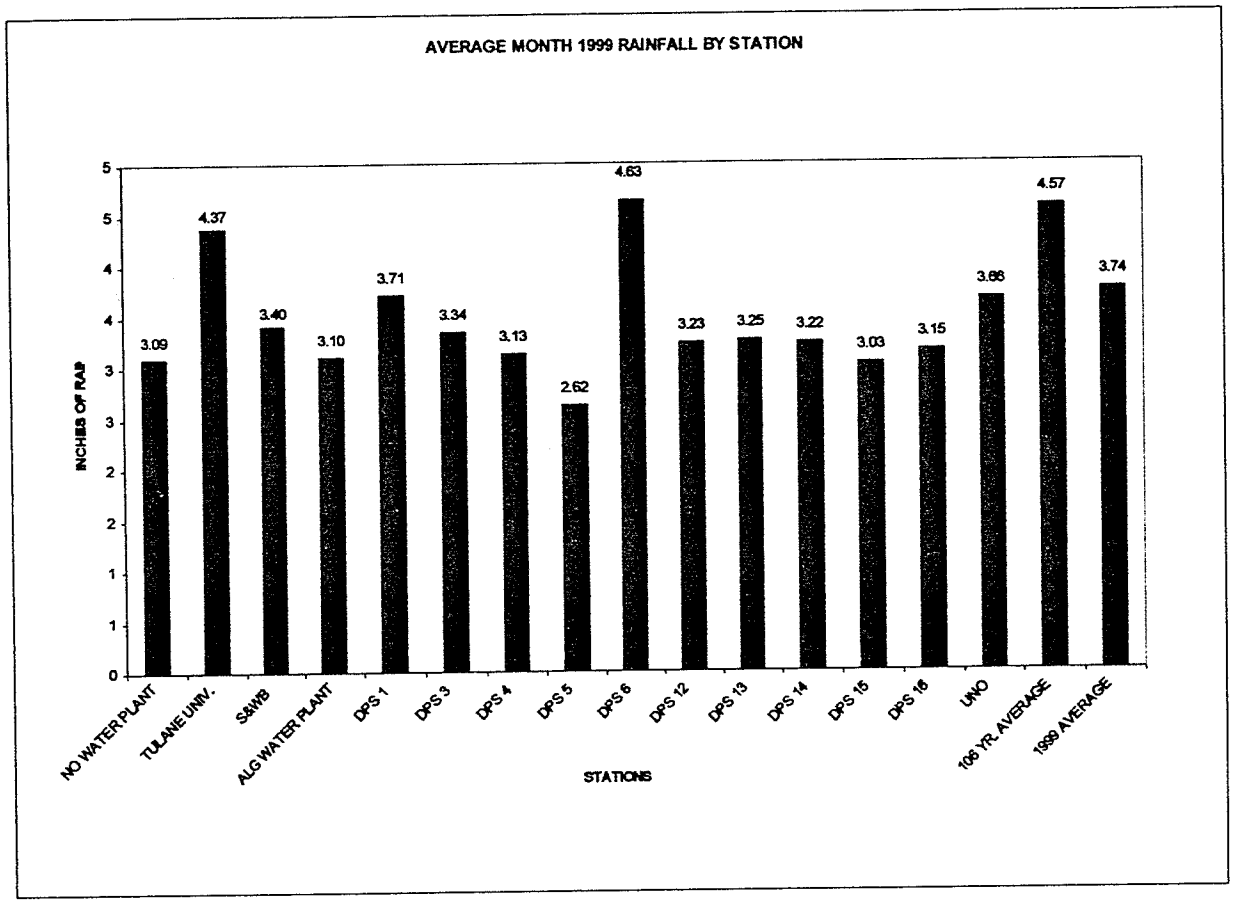
The U. S. Department of Agriculture sent me the script for a new termite video, which they wanted our help to produce. They wished to use video that we have already shot to minimize their production costs. I reviewed their script, and arranged for them to copy some of our tapes under my supervision.

The cap brochure was modified for use with bait systems other than the Sentricon system. The copy center at city hall was able to print these for us after the files were converted to .PDF format (Adobe Acrobat format).

The termite division had compiled a database of trees, which had been inspected for termites. They wished to import this database in File Maker Pro format into ArcView so that maps of tree data could be produced. ArcView is designed with this in mind, and although the original database design was incompatible it required only minor revisions for ArcView to read the records. Each tree (record),

in the database was translated by ArcView into a point on the map of New Orleans. This process is known as Geocoding. Maps can now be produced in which records are selected by any criterion in the database.

Evaluation of thermal imaging for detection of termites continued with the evaluation of several buildings for the Termite Division. In one case, termites had destroyed the window casings in one of the judge's chambers in the courthouse. The chambers were on the second floor of a mostly stone building. The termite nest was finally located by thermal imaging in the wooden floor of the room above the chamber. The nest was found even though we had to scan through a carpet. The nest was baited and later checks found a multitude of dead termites including alates.



ENCEPHALITIS --

Greg Thompson

The year started off with representatives of Louisiana's mosquito control agencies meeting to evaluate our encephalitis surveillance programs. Among the concerns discussed were the time lag between sample collection and available results and the perceived high number of false positives reported by the state lab. The collected blood samples are sent to the state lab in New Orleans where they are tested for the presence of encephalitis antibodies. If antibodies are detected, then control measures are immediately implemented. Unfortunately, an easily controllable problem could become an epidemic during the time lag between collecting samples and receiving test results. Additionally, false positives indicating the presence of encephalitis antibodies in processed samples outnumbered true positives by more than a four to one margin in 1998. A false positive triggers the same rapid response that a true positive triggers. Intensified treatment of an area using truck and/or planes means extra expenses for agencies with limited budgets.

Our concerns lead to a meeting with the manager of the state's virology lab, Steve Martin. The meeting resulted in the implementation of a more streamlined collecting and processing system. In addition, false positives seem to have been virtually eliminated this year without excluding any actual positives. This was accomplished by slightly raising the bar for what is considered a possible positive.

Seventeen large cages, each holding four chickens, were placed at area firehouses and several other locations throughout the city. Each bird occupied its own individual numbered compartment within these large cages. The cages are placed throughout the city in a pattern influenced by distribution of human populations, location of previous encephalitis cases, and site availability.

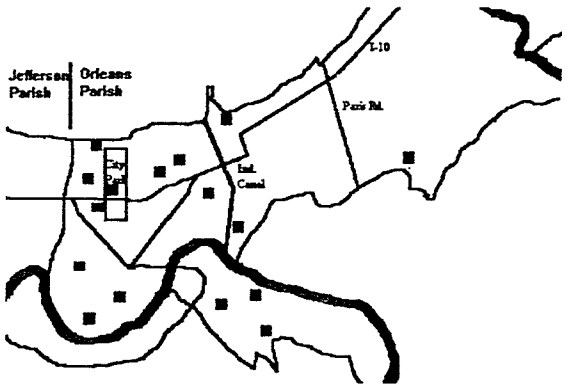
We have traditionally maintained our encephalitis surveillance program from mid-May through early October. This five-month period surrounded the dates of every known encephalitis case that had ever occurred in Louisiana. The director of NOMTCB made the decision last spring that for research purposes we would maintain our surveillance efforts through all but the coldest months. We had wondered whether encephalitis cases might still be occurring in birds during our warm winters even though no human or domestic animal cases had been documented. The decision to extend our surveillance program could not have been better timed.

Let us hope that the last quarter of the last year of the century is not indicative of what the future will hold for encephalitis occurrence in the country in general and in Louisiana in particular. Nationwide, the first reported occurrences of West Nile Fever in the United States resulted in near panic in the New York area. The possibility of birds bringing the disease with them on their fall migrations also heightened tensions throughout the south and provided additional justification for maintaining our flocks of sentinel chickens.

Thirty years of surveillance activities had seemed to suggest a recurring pattern for the detected presence of encephalitis in Louisiana. Both St Louis Encephalitis (SLE) and Eastern Equine Encephalitis (EEE) had shown a general pattern of occurrence where a summertime outbreak of one of these diseases was followed by as much as a decade long hiatus before the disease made its reappearance in our area. When SLE cases were reported across Louisiana in 1998, it ran contrary to this pattern because cases of SLE had occurred in our area in 1996. This seeming long-term pattern may have been completely destroyed this past year when SLE was once again detected in bird blood. This means that SLE has been documented to be present in our area in three of the last four years. This year's SLE cases were mixed in with a much larger outbreak of EEE cases.

Our extended surveillance efforts from October through December did not detect the presence of encephalitis in either sentinel chickens or mosquito pools. However, several other Louisiana parishes also extended their surveillance programs through the fall and their monitoring efforts yielded disturbing results. Mosquito pools collected in late October in St Tammany and East Baton Rouge tested positive for EEE. The finale for this year occurred in St Mary Parish in the last week in October. A horse contracted Western Equine Encephalitis (WEE). This was not only the latest in the year that a case of encephalitis is known to have occurred in Louisiana but it was also the first recorded case of this particular disease in our state.

State wide encephalitis figures include many cases of EEE and one of WEE. No human fatalities occurred; however, two confirmed cases of EEE were reported. In addition to these non-fatal human case, nearly 100 horses, about 200 emus, and one sheep were confirmed with EEE infections.



BIOLOGICAL CONTROL —

GREG THOMPSON

This year the staff of the Biological Control Lab spent a large percentage of their time participating in the encephalitis surveillance program (see separate report). Sentinel flocks of chickens were maintained and monitored from April through the end of the year.

Colonies of several species of mosquitoes are constantly maintained at the lab for use in research. The species of *Aedes* mosquitoes kept as colonies in the lab are container-breeding floodwater mosquitoes. They lay their eggs just above the waterline of water-holding containers. When it rains in the natural environment, the water level in the container rises and the eggs hatch into water sufficient to complete their development into flying adults. We can collect eggs from these mosquitoes by providing them with partly water-filled cups lined with removable strips of stiff paper. The eggs laid on these strips can be removed and stored for future use. These eggs are maintained at a warm temperature and a constant 80% relative humidity. With this special attention, most eggs remain viable after two years. Eggs maintained, even under these ideal conditions, begin "collapsing" after this time. These collapsed eggs have a concave appearance when viewed under a stereo microscope.

We recently discovered an egg-covered strip of paper that had not been stored in the high humidity chamber. This paper was covered with *Ae aegypi* eggs laid more than thirty months previously. Nearly all of the eggs had collapsed into themselves.

To find out whether any eggs remained viable, the strip was submerged in water. The paper was removed after six hours and the water searched for any larvae. A very small number of eggs did hatch. It appeared that perhaps less than 0.1% of the hatch that would have been expected from a one month old strip occurred from this strip. The unhatched eggs were then examined under magnification. Most eggs still appeared collapsed and non-viable, however, some eggs had expanded and taken on a normal look.

The strip was allowed to sit overnight. The previous procedure was repeated for the next four days. The number of larvae hatching each day remained at the same depressed level. However, more eggs reinflated after each soaking. The strip was then permitted to dry for one week. When it was then resubmerged, the

number of larvae emerging from the eggs now appeared visually to be equivalent to the expected hatch from recently laid eggs.

In an additional series of tests, we examined the cold-hardiness of our local *Ae. albopictus* mosquitoes. Wild-collected eggs that had been stored for six months in the laboratory at 80 F and 80% relative humidity were submerged in 50 F water and kept there for 24 hours. The hatch appeared to be approximately 10% of what would be expected if the water temperature had been 70 F or warmer. The larvae were divided into two groups. One group was maintained at 50 F. None of these larvae completed development. Larvae in the second group did complete development when the water temperature was raised to and maintained at room temperature (about 72 F). Larvae from this same wild-collected eggs that were hatched at about 72 F and maintained at that temperature for 24 hours before being cooled to 50 F for 24 hours had less than a 1% survival rate after 24 hours in cold water.

We plan to continue looking at long-term viability in a more quantifiable scientific manner. However, even these rough results demonstrate that our local container-breeding *Aedes* mosquitoes possess adaptations that permit recovery from egg desiccation even though extended periods of dry conditions are unlikely in Louisiana. We plan to compare our mosquitoes to those from north Louisiana where dry weather and cooler temperature are regularly encountered.

Each year our public education/outreach programs increase in size, scope, and number. An incomplete list of these shows is still very extensive. The 1999 shows included Tulane University's Environment and the Law conference, Audubon Zoo's two day Earth Fest and two weekend Swamp Fest, City Park's two day Spring Garden Show and two day Fall Garden Show, and New Orleans's Day at the State Capitol. We educated people about mosquito and termite control at the Mayor's Earth Day celebration at the Girod Street Green Market, at two of the Mayor's public meeting/awards ceremonies, at the multi-day Air Show in Belle Chasse, at two shows at the La Nature Center, at four summer camps of the US Fish & Wildlife Service, and at seven additional part-day programs at the Audubon Zoo. We set up a booth at a Home Depot store, at a city clean-up event, and at a veterinary event at Xavier University to spread information on both mosquitoes and termites. We visited ten grade schools and six groups of students, including several classes from the Tulane School of Public Health, visited our facilities.

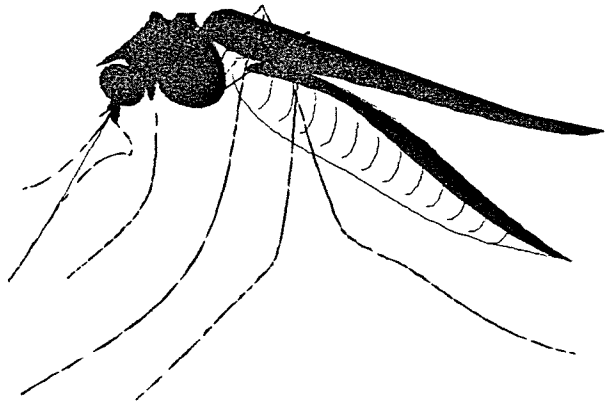
This year, three students from Ben Franklin High worked on state science fair projects with the assistance and supervision of lab staff. We look forward each year to working with some of these best and brightest of New Orleans students. Our ample laboratory also permits us to offer research space to other organizations. Both LSU and US Fish & Wildlife make use of this offer.

This year fewer foreign visitors actually visited NOMTCB to learn about the use of biological control techniques. However, we did spend time with a very interested and interesting delegation from the Democratic Republic of Congo. The fact that fewer foreign delegations visited here in no way reflects a lessening of international interest in biological control. We are in e-mail correspondence with an increasing number of researchers and mosquito control personnel worldwide. We continue to be involved with developing biological control programs in Martinique and Vietnam.

Dr. Janet McAllister, formally of the Center for Disease Control and now with NOMTCB, tested the susceptibility of adult *Aedes albopictus* mosquitoes obtained locally and *Culex pipiens* mosquitoes from the country of Jordan to six pesticides commonly used by mosquito control agencies or by homeowners for insect control.

Working with Hoa Lam, a student at Tulane University, they demonstrated that local mosquitoes show no more resistance to the chemicals used by NOMTCB than are shown by mosquito populations never subjected to previous control efforts (result chart appears in the July-September Quarterly Report). This positive result can probably be attributed to the Integrated Pest Management (IPM) procedures used by NOMTCB.

The effect of persistent unregulated use of pesticides seems to be reflected in the other results obtained in this study. Local *Ae. albopictus* population showed significant resistance to Permethrin, a pesticide, used by homeowners for insect control. The *Culex pipiens* mosquitoes from Jordan had faced continual use of pesticides by local residents and they showed significant resistance to each of the chemicals presented.



TERMITE ENTOMOLOGY --

ED FREYTAG

During our coldest two months, **January** and **February**, our Termite Division continued to operate at full capacity. This component of our program consists of two entomologists and three termite technicians. One new project, in cooperation with the USDA Full Stop program, is the baiting of the former Wildlife and Fisheries building at 400 Royal St. This turn-of the-century stone building occupies the entire block, and will be the largest building that we have baited (1,500' footprint). This baiting will begin in March.

Operations during Mardi Gras week were suspended due to the large crowds and parking problems. Surprisingly, only a few bait port covers were taken.

A tree foamed with the liquid termiticide Premise (Bayer) in 1997, was cut down in February. Originally, this tree was heavily infested with Formosan termites. An inspection on the trunk sections, as it was being cut down, revealed only a large, dry carton nest and mud packs.

Global (monitoring) bait-like stations were installed in the French Quarter "test" site in mid-December and monitored in January and February. Monitoring is being done along with the USDA and LSU personnel. Several of the stations had Formosan termites in January, indicating active feeding during the winter.

We also began discussion with Rhone-Poulenc concerning a treatment project using the liquid termiticide fipronil. We will be treating trees and structures under a federal experimental use permit. The protocol for this project will be complete by early spring.

Several termite tours of our termite projects were given including one for Pest Control Technology Magazine.

Additionally, several projects involving mapping and GIS were continued in cooperation with USDA, LDAF and LSU.

During **January** and **February**, 8,000 termites were dyed and released in Armstrong pork for colony characterization including termite age. The first Formosan alates (swarmers) for the year were collected from sticky traps placed below light posts in the park. These traps will be monitors throughout the year. A new digital decay/termite damage detecting drill was demonstrated by its

distributor and has a penetration range from 15" up to 39". This drill will allow us to determine the interior condition of nearly any tree in the city.

In **March**, termite entomology efforts were again directed to the USDA French Quarter , project and related projects including several presentations and tours of the projects that are underway. Work continued with the use of Permise applied as a form to trees infested with Formosan termites. This work was reported on at the Southeastern Branch of the Entomological Society of America Meeting in Florida.

A new list of infested trees that are going to be removed was obtained from Parkway and we are hoping to treat these trees before they are cut down. This is the best method available to evaluate the effectiveness of the treatment. All of the regular monthly inspections were completed with some new activity noted in sites that were negative.

The Armstrong Park project continued with the collection and release of over 25,000 dyed termites. Triple mark-recapture efforts continued as we identify the extent of the colonies and the size of the colonies. Dyed termites released in underground monitoring stations have been collected in infested trees, thus proving the connection between ground infestations and tree infestations. Sixty-two sticky traps have been placed throughout the park and some alate activity has bee detected by this collection method. Eleven large nuptial chambers have been built and installed throughout the park. A sstatewide termite survey has been started and cover letters, vials of alcohol, data sheets and return envelopes were mailed to over 580 pest control operators throughout the State.

During **April**, the Termite Division observed a reinvasion of treatment sites where Sentricon bait systems had previously eliminated the termite colony. This demonstrates the advantage of using monitoring devices, which we simply replaced with baitubes containing hexaflumuron, thus preventing building damage. Triple mark-recapture buckets have been placed around several buildings and trees in hopes of carrying out termite experiments with fiprinil, a nonrepellent termiticide. Minor coring problems continued to hamper the USDA French Quarter project where sidewalks are constantly under repair and Global Sentricon stations have to be reinstalled.

Numerous complaints were received concerning Formosan termites in city-owned trees. Trees found upon inspection to be both internally infested and with swarming mud tubes on the bark may be used in experimental termiticide tests. This year we will be treating 25 trees with chlorfenapyr for American Cyanimid and 40 trees with fipronil for Rhone-Populenc. The information we obtain from these tests will help in determining how to control the termites in the trees and how long these treatments last before they become reinfected.

The Armstrong Park project's triple mark-recapture procedures are going well with collection, dying and release of more than 20,000 native and Formosan termites into the park this month. Temperature probes have been installed in and around several trees to obtain information on the correlation between termite activity and temperature at different locations. Samples of Formosan termites from each of the park's colonies have been sent to researchers at the University of Hawaii for DNA fingerfprinting in hopes of finding genetic distinctions among colonies in Hawaii and New Orleans.

Sixty-eight sticky insect traps dispersed throughout the park detected a large alate swarm and a series of smaller swarms as the month ended. Three additional nuptial chamber boards were established for a total of 14 scattered around the park. These will be inspected monthly for termite pairs that may have established a colony. The statewide termite survey has been updated and mailed out to pest control operators and mosquito control offices throughout the state. It is hoped to elicit a greater interest than the 14% positive response received by the original mail-out.

During **May** and **June** Formosan termite control efforts continued with the expansion of our efforts around Jackson Square and the Pontalba Apartments. Baiting of City buildings continued and treatment of City trees increased with labeled and experimental products. Several of these projects were involved with the State of Louisiana Department of Agriculture and Forestry. On May 4, USDA Operation Full Stop conducted an open meeting at the Royal Sonesta Hotel and a full report was presented by the Full Stop Partners. The French Quarter project is just about completed and we are in the monitoring stage. Work will continue with USDA, LDAF, DowAgrsciences, American Cyanamid, Bayer and Rhone-Poulenc.

July, **August** and **September** saw termite control activities concentrated on the several research trials with new active ingredients and new application techniques of existing products. New liquid termiticides that can affect the colony are being evaluated. Most of the existing termiticides were designed to protect the structure and not reduce the colony size. Some of these new products are proving to be much more effective and nave the potential to impact the colony. All of the city structures baited with the Sentricon system have been checked and are still doing well. The demand for presentations on Formosan termite control continues to grow and several training sessions were conducted for various groups and organizations. A very informative, three-day meeting was held with the National Center for Preservation and Technology and Training. This session included many representatives of the military, other federal agencies, state government, local government, universities, the Getty Foundation and several private groups involved in historic preservation.

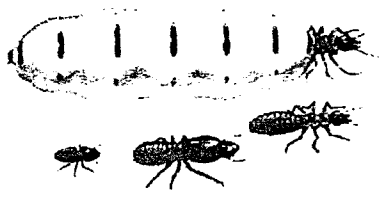
The Armstrong Park study continues with additional Formosan and native subterranean colonies being characterized by triple mark-recapture. Alate termite

specimens were collected in Armstrong Park and the results of those sticky trap collections are included in the corresponding Monthly Reports. A species of drywood termite that was not identified in Louisiana has been collected in Armstrong Park. As part of the Operation Full Stop, we are collecting termite specimens from around the State of Louisiana. We are in the process of bulk dying individual termite colonies to allow us to more accurately identify the foraging territory of that colony.

From **October through December**, Formosan termite control activity continued at the break neck level that includes operational control on city structures and city trees, experimental projects with termite baits, nonrepellant liquid termiticides, foam applications to trees, testing termite sniffing fogs and characterization of termite colonies when treated with the new nonrepellant termiticides. The NOMTCB partners with the pest control industry and the manufacturers to treat the structures to be evaluated and board personnel then monitor and evaluate the treatment over a specified time. Trees and structures are included in this process. Several presentations were made during the past quarter. We were represented at the Hawaiian Pest Control Association and the Entomological Society meeting in Atlanta. Reports were made to USDA and all of our commercial partners. A group of pest control operators from Singapore visited our test sites and our operational sites in the city. A clear, plastic, simulated tree was assembled and was used to test and evaluate foaming products to be used in the Louisiana Department of Agriculture project beginning in early 2000.

The combined USDA, NOMTCB, University of Florida and University of Hawaii project at Armstrong Park is about to move into the second phase of the study. Termite colonies have been identified as to range and numbers. Additional dying and capturing is taking place to further define feeding cohorts and foraging range. Two publications are in progress at this time. The first publication is titled "Measuring Wood Consumption of Subterranean Termite by Using Digitized Images" by Su and Messenger was accepted by the Journal of Economic Entomology and the second publication titled "First report of *Incisitermes minor* (Hagen) (Isoptera: Kalotermitidae) in Louisiana" by Messenger, Scheffrahn and Su was accepted by Florida Entomologist. These publications will appear in the first quarter of 2000.

Another aspect of our studies with USDA has to do with a statewide survey of termite species. Currently we have identified eight subterranean and drywood termite species in Louisiana. We have discovered one species of drywood that is new to the state and there are probably several more yet to be discovered.



TERMITE ENTOMOLOGY

"Armstrong Park Study"

MATT MESSENGER

Louis Armstrong Park is one of the many projects included in the Operation Full Stop Program, which is led by USDA-ARS in New Orleans. The goal of the Louis Armstrong Park project is to identify and characterize each subterranean termite colony and monitor the invasion by nearby established colony(s), or re-establishment of new colony(s) by alate pairs into vacated territory of colony(s) that have been eliminated using baits containing hexaflumuron.

A triple mark-recapture (TMR) procedure was initiated in May 1998 to identify and characterize every termite colony present in the park. In 1999, over 132,000 Formosan and eastern "native" subterranean termites were collected, dyed, and released into Armstrong Park. Currently, there are 60 underground and aboveground monitoring stations installed throughout the park. Eleven of the estimated 14 Formosan colonies were characterized using TMR. I was only able to complete one or two mark-recaptures on four of the six native subterranean termite colonies. These native colonies in the park tend to be easily disturbed and will usually abandon monitoring stations after an initial disturbance.

The table on the following page lists the characteristics for each of the 11 Formosan colonies. A current map showing the foraging territory for each colony follows the characteristic table.

As of December 31, 1999, there were 151 infested trees out of 767 remaining trees (20%) in the park. Twenty-two trees have been removed since I began the study in May 1998 and 11 trees have fallen due to a combination of inclimate weather and termite damage. Due to limitations in detecting devices and visual inspections, the number of infested trees may be greater than 20%.
The most commonly infested trees include:

-Red maple	26 out of 32	(81%)
-Redbud	9 out of 14	(64%)
-American sycamore	7 out of 131	(36%)
-Green ash	5 out of 18	(28%)
-Live oak	21 out of 114	(18%)

The least commonly infested trees include:

-Southern washingtonia	0 out of 23	(0%)
-Willow oak	0 out of 24	(0%)
-Bradford pear	0 out of 13	(0%)
-Japanese magnolia	0 out of 12	(0%)
-Crepe myrtle	1 out of 58	(2%)
-Chinese parasol tree	2 out of 36	(6%)

The list below represents the total number of alates recovered during 1999 from 68 glue traps and a light trap in Armstrong Park.

9,666	Formosan subterranean termites	(*Coptotermes formosanus*)
28	Western drywood termites	(*Incisitermes minor*)
23	Eastern subterranean termites	(*Reticulitermes flavipes*)
6	Dark southern subterranean termites	(*Reticulitermes virginicus*)
2	Southeastern drywood termites	(*Incisitermes snyderi*)

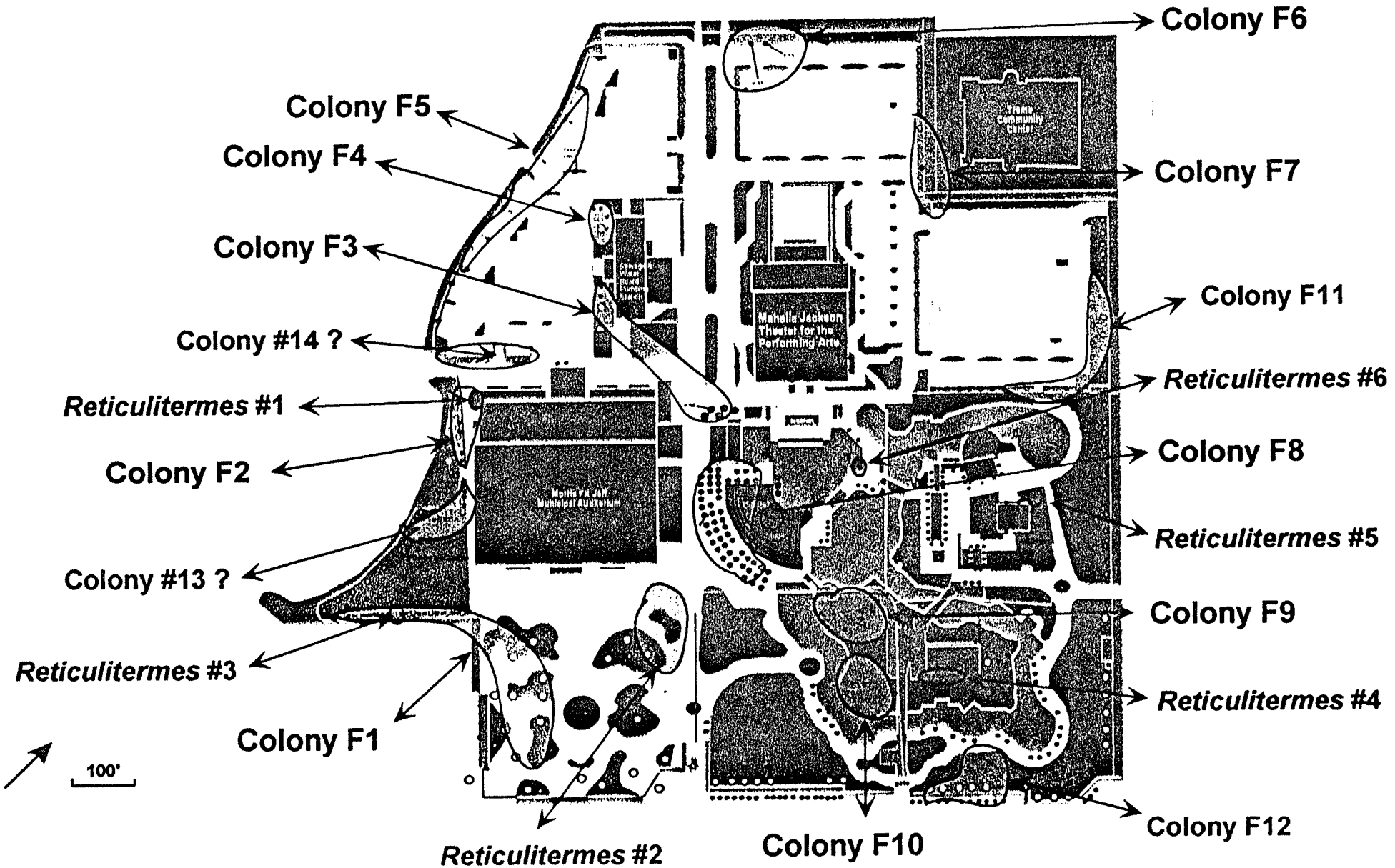
The 1999 total rainfall average from two rain gauges inside the park was 37.6 inches.

In March, cover letters describing the purpose and goals of a statewide termite survey were mailed to each pest control operator and mosquito control district in Louisiana. Initially, 580 letters were mailed and we received 126 (22%) responses. Of those who responded, 81 (14%) were willing to participate and 45 (8%) were not. Currently, there are 87 participants throughout the state, including three in Mississippi and one in Texas. Each participant was mailed a collecting packet, which included collection vials, data sheets, and an aspirator. Throughout the year, 46 of these 87 participants have returned over 200 vials containing termite alates, soldiers, workers, and secondary reproductives. The following list represents the total number of each species received and identified in 1999:

96 vials containing *Reticulitermes flavipes* (Eastern subterranean termite)
79 vials containing *Coptotermes formosanus* (Formosan subterranean termite)
29 vials containing *Reticulitermes virginicus* (Dark southern subterranean termite)
5 vials containing *Incisitermes snyderi* (Southeastern drywood termite)
1 vial containing a *Heterotermes* spp. Collected from Antigua Island air base
25 vials containing an unknown species (either empty or containing only workers)
In addition, the following species have also been collected around Louisiana by NOMTCB staff or other individuals:

Incisitermes minor (Western drywood termite)
Reticulitermes hageni (Light southern subterranean termite)

Louis Armstrong Park - 1999
Subterranean Termite Colony Foraging Territories



Kalotermes approximatus (no common name)

An updated map showing the distribution of the four most common species is presented on the following page.

The following table represents data from the first agonistic behavior trial. All eleven colonies showed aggression towards at least one other colony. Three colonies only showed aggression towards one different colony. Four of the eleven characterized Formosan colonies were aggressive toward three or more different colonies. The data from these agonistic behavior experiments will help determine why each colony has defined foraging territories and whether or not nearby colonies are related.

Aggressive Responses Towards Other Colonies

Colony #	1	2	> 3
1	Yes	Yes	No
2	Yes	No	No
3	Yes	Yes	Yes
4	Yes	No	No
5	Yes	Yes	Yes
6	Yes	Yes	No
7	Yes	No	No
8	Yes	Yes	Yes
9	Yes	Yes	No
10	Yes	No	No
11	Yes	Yes	Yes

Throughout the year, termites from each colony in the park were sent to Drs. Ken Grace and Claudia Husseneder (Univ. of Hawaii) for DNA fingerprinting. Dr. Husseneder presented preliminary results from the DNA analysis at the Entomological Society of America Annual Meeting in Atlanta. She was able to show how the genetic colony structure for Formosan colonies 1, 4, 5, 8, and 10 were different. Further evidence was provided by using triple mark-recapture which enabled me to better define the foraging territory for each colony. During 2000, Dr. Husseneder plans to complete the DNA fingerprinting process for each colony present in the park.

In August, we received the new Sibert Technology Digital Micro Probe (DmP) decay detecting drill. This new drill attaches to a laptop computer and records the amount of resistance inside a tree or structural timber. It also records the amount of force you exert as you drill a tree or structural timber. The data is immediately displayed on a graph in Microsoft Excel. We loaned the original Sibert Technology Decay Detecting Drill (DDD) to Parks and Parkways' Tree Department to help with their tree inspections.

Results - Colony Characteristics

Formosan Colony #	Mean Worker Weight (mg)	Foraging Territory Area (m^2)	Mean Wood Consumption Rate (g/station/day)	Foraging Population Estimate
1	3.7	2626	0.90	1.6×10^6
2	3.8	611	0.97	1.0×10^6
3	4.3	1073	1.10	3.6×10^6
4	3.1	179	2.85	1.1×10^6
5	4.4	1095	1.10	0.5×10^6
6	4.3	1080	1.07	0.1×10^6
7	3.7	464	0.80	0.8×10^6
8	3.8	1187	1.73	0.6×10^6
9	4.5	948	0.76	1.2×10^6
10	3.1	754	1.90	0.8×10^6
11	3.5	1039	1.45	1.4×10^6

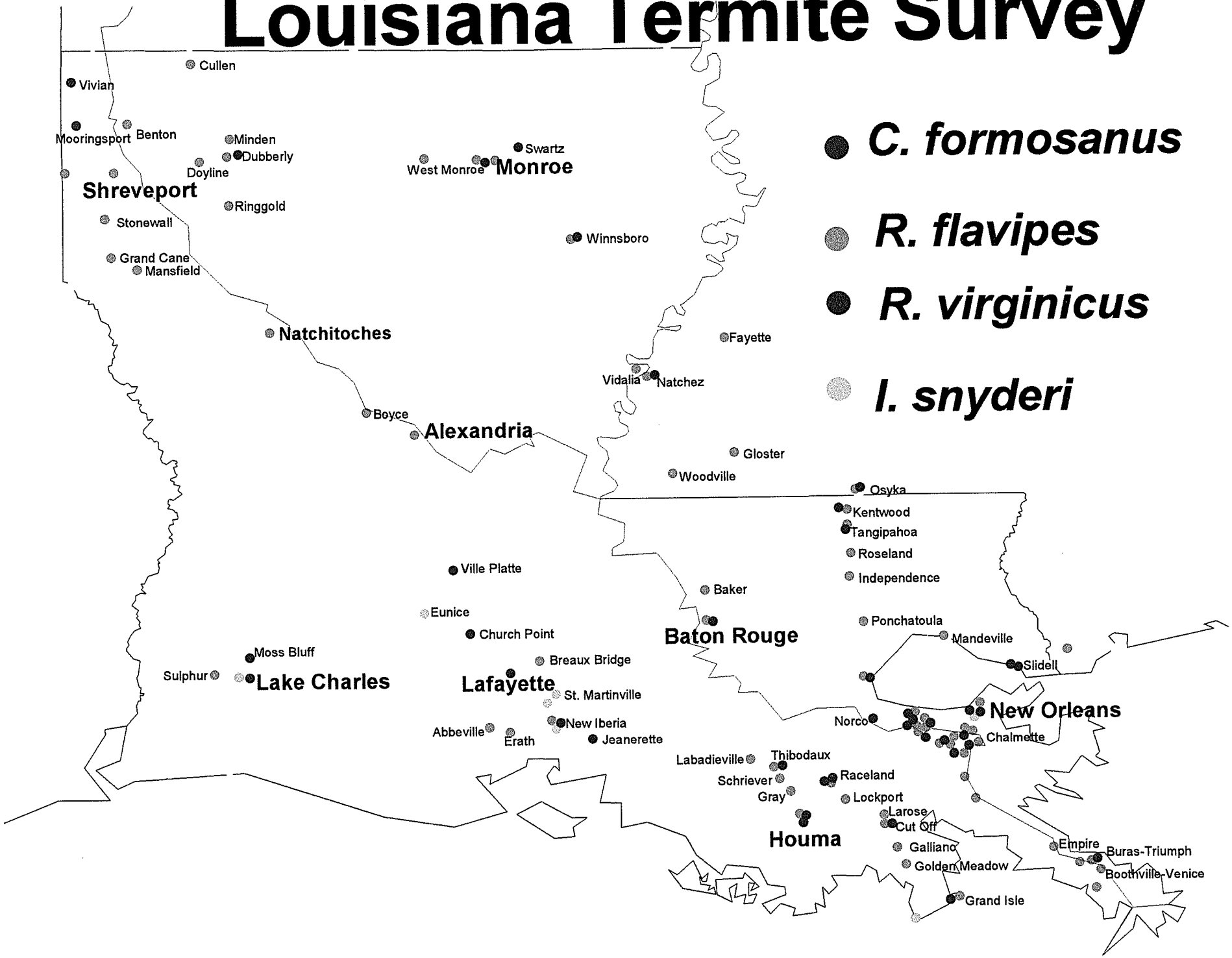
I participated in the National Center for Preservation Technology and Training (NCPTT) workshop that was held on September 20 - 22 in the Municipal Auditorium. I gave a demonstration on both the old and the new decay detecting drills and described the many advantages of using a decay detecting drill to locate termite galleries in trees. In addition, I gave a PowerPoint presentation on the basics of TMR and the many advantages to conducting TMR studies with termite colonies in and around structures. I followed up my presentation with a walking tour of Armstrong Park and showed how to begin conducting a TMR study in the field.

In October, two manuscripts were accepted for publication. The first entitled "Measuring Wood Consumption of Subterranean Termites by Using Digitized Images" by Su and Messenger was accepted by the *Journal of Economic Entomology* and the second entitled "First Report of *Incisitermes minor* (Hagen) (Isoptera: Kalotermitidae) in Louisiana" by Messenger, Scheffrahn and Su was accepted by *Florida Entomologist*. This publication will appear in the March 2000 issue.

Mr. Ed Bordes, Mr. Ed Freytag and I attended the Entomological Society of America Annual Meeting in Atlanta in December. I presented a 10-minute paper during the student competition session. I focused my talk on colony characteristics of the 11 Formosan colonies in the park. While in Atlanta, Ed Freytag and I attended the Rhone-Poulenc Termidor Termite Control Seminar to discuss current research being conducted with fipronil, their new liquid termiticide. We also attended the Dow AgroSciences annual meeting for authorized Sentricon dealers. Current research and better business practices were presented at this meeting.

In the year 2000, I will begin eliminating two or three Formosan termite colonies in Armstrong Park using the Sentricon baiting system. I will also be monitoring the area for re-invasion or movement of existing colonies into the vacated territories. I will also continue characterizing the remaining Formosan and native subterranean termite colonies. In addition, termite activity in the trees will be monitored over time and swarming activity will be monitored using glue traps and a light trap. The agonistic behavior trials will be repeated at least two more times in order to complete the experiment. The statewide survey involving pest control operators will only continue through the end of this year. However, NOMTCB staff will continue surveying areas of the state where Formosan activity has been reported. This will lead to a more detailed, current distribution map of the Formosan range throughout the state.

Louisiana Termite Survey



VECTOR/RODENT CONTROL -

JOESPH A. YURT, Director

1999 ANNUAL

The Typhus surveillance program monitors the river front by live trapping rodents on the wharves. During the year, three rats were live trapped. Bloods were extracted from the rats and sent to the state laboratory for compliment fixation testing for Typhus. All tests were negative. Ectoparasites are combed from the rats and identified. The Ectoparasite of concern is *X. cheophis* which transmits the disease from rodent to man. A flea count is maintained and used as an index for crisis management. There is no treatment of the wharf area unless a crisis is detected. The commercial entities are responsible for rodent maintenance on the wharf.

Strategic Inspection Force is a program designed by the Chief Administrative Office to bring all city agencies and the community together for a concerted effort to rid the community of environmental deficiencies and improve the appearance of the blighted areas of the city. Vector/Rodent Control treats the area prior to the clean up to prevent the disbursement of rodents in the community. Pest Control technicians inspected 286 blocks, 8257 properties with unapproved refuse containers, 165 premises with exposed garbage, 572 source reduction notices were issued and seven pounds of rodenticide was utilized.

The program inspected and/or treated the following city owned properties during 1999. One hundred twenty-six police facilities, 162 inspections of fire stations and 612 other city owned facilities utilizing 214 gallons of finished spray and 444 pounds of rodenticides, 44 ounces gel bait and 41 cans of crack and crevice.

During 1999 services were conducted in nine target areas. (Black Pearl, Michoud, Central City, Lower Nine, Ninth Ward, Gentilly and Chef Menteur) Pest control technicians inspected 920 blocks, 22,341 premises to determine rat infestation

and other environmental deficiencies. Of the premises inspected, pest control technicians reported 1,034 unapproved refuse containers, 110 premises with active rat signs and 384 premises with exposed garbage. Twenty seven pounds of rodenticide was used.

Source reduction notices were issued by pest control technicians to premises with environmental deficiencies such as high grass and weeds, trash and debris, exposed garbage and/or improper storage of material and any other conditions that may cause a rat harborage. O,407 source reduction notices were issued. The violations noted on the source reduction notices were sent to Environmental Enforcement, a division of the New Orleans Health Department, for corrective action.

During the year Vector/Rodent Control received 1,472 complaints from the community. All the complaints were serviced via investigations, referral or consultation. We used 803 pounds of rodenticide in servicing the complaints. There were no rat bite cases reported to Vector/Rodent Control in 1999.

Demolition inspections are designed to prevent the disbursement of rodents in a community from the demolition of a building. According to city ordinances, before Safety & Permits issues a demolition permit to a contractor Vector/Rodent Control must declare the building free of rodents. Fifty premises and/or commercial buildings were inspected and declared rodent free.

Strategic Inspection Force is a program designed by the Chief Administrative Office to bring all city agencies and the community together for a concerted effort to rid the community of environmental deficiencies and improve the appearance of the most blighted areas of the city. Vector/Rodent Control treats the area prior to the clean up to prevent the disbursement of rodents in the community. Pest control technicians inspected 286 blocks, 8,257 premises and found 35 premises with active rat signs, 442 premises with unapproved refuse containers, 165 premises with exposed garbage; 572 source reduction notices were issued and 7 pounds of rodenticide was utilized.

The program inspected and/or treated the following city owned facilities or properties during 1999. One hundred twenty-six inspections at police facilities, 162 inspections at fire stations, 612 other city owned facilities utilizing 214 gallons of finished spray and 444 pounds of rodenticides, 44 ounces of gel bait, 41 cans of crack and crevice.