New Orleans Mosquito Control

The Best Protection From Encephalitis

Surveillance And

Effective Mosquito Control

Annual Report

~ 1976 ~

PRIDE BUILDS NEW ORLEANS

MOON LANDRIEU
MAYOR

CITY OF NEW ORLEANS

ORLEANS PARISH MOSQUITO CONTROL

12TH ANNUAL REPORT

1976

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George T. Carmichael, Director

New Orleans Mosquito Control Board/ George T. Carmichael, Administrative Director
6601 Lakeshore Drive/New Orleans, La. 70126

NEW ORLEANS MOSQUITO CONTROL BOARD
ORGANIZATIONAL CHART

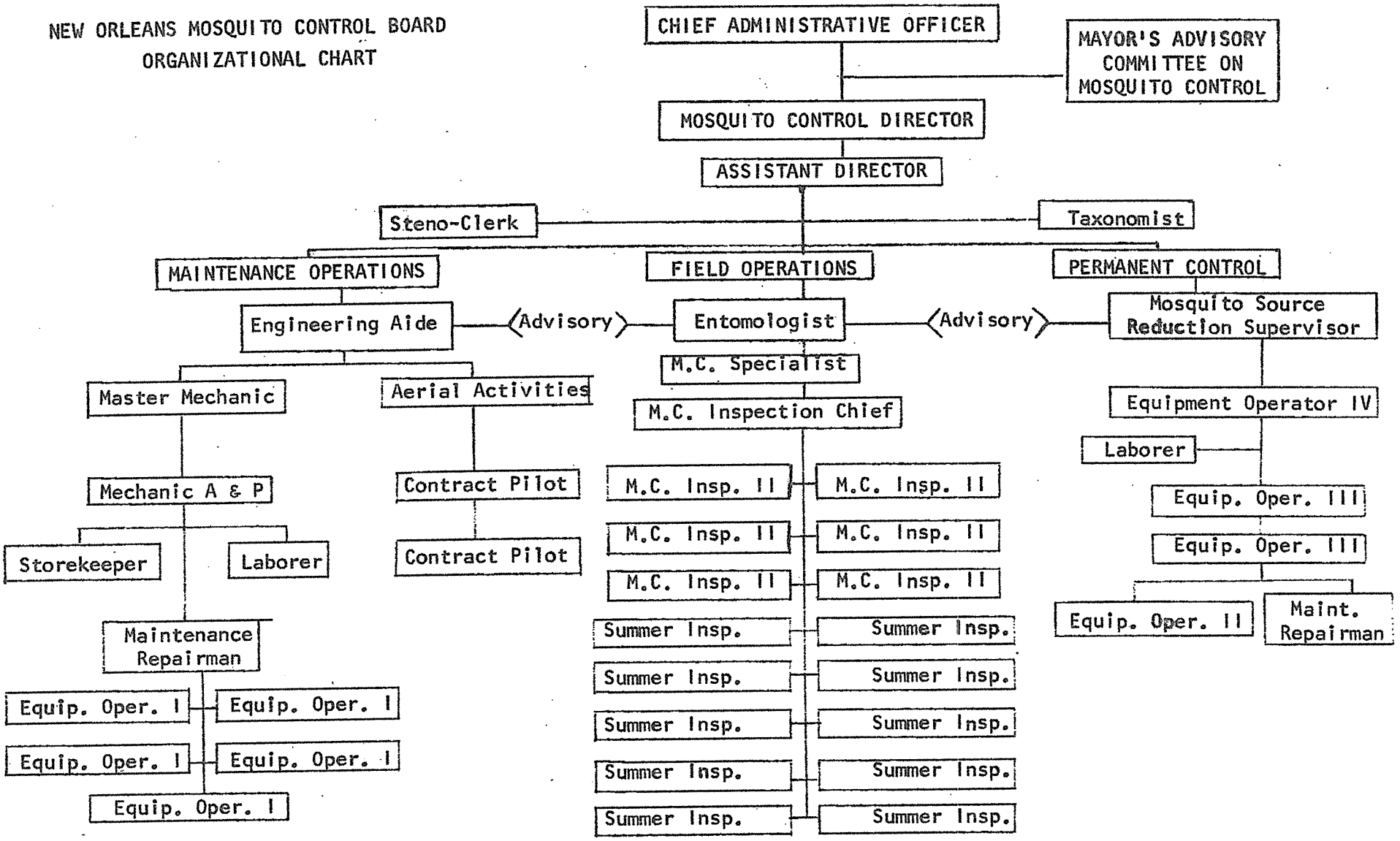


TABLE OF PERSONNEL

1	Director
1	Assistant Director
1	Entomologist
1	Engineering Aide
1	Source Reduction Supervisor
1	Mosquito Control Specialist
1	Equipment Operator IV
1	Master Mechanic
2	Equipment Operators III
1	Steno-Clerk
1	Mosquito Control Inspector Chief
1	Taxonomist
6	Mosquito Control Inspectors II
2	Maintenance Repairmen
5	Equipment Operators I
2	Laborers
10	Seasonal Part-time Workers

MOSQUITO CONTROL EQUIPMENT LIST		
1	1976	4-dr. Ford Sedan
1	1973	4-dr. Ford Sedan
1	1970	4-dr. Ford Sedan
1	1976	Plymouth Volare Wagon
1	Aircraft	Douglas DC-3
1	Aircraft	Grumman Ag-Cat
2	Backhoes	John Deere 310
1		Crawler Case 350
1	Dragline	Little Giant Amphibious
6	1964	Ford F-250 Fog Trucks
1	1965	Ford F-250 Fog Truck
4	1971	International Pickups
10	1976	Chevy Luv Pickup Trucks
2		Ford Pickup 4-Wheel Dr.
4	1975	GMC Pickups
1	Forklift	Caterpiller
1	Forklift	Allis-Chalmers
1	1965	Ford 3/4 Ton Larv. Truck
1	Wheel Buggy	
1	Track Marsh Buggy	
1	Tractor Mule	
3	Utility Trailers	
1	Trailer Tractor	
2	Gasoline Tank Trucks	
1	Boat, 15' Fiberglass	
2	Boat Trailers	
2	Outboard Motors - 33 Hp. + 5 Hp.	
2	Aluminum Flatboats	
4	Honda CT-70 Motorcyles	
2	1973	Ford Econoline Vans
4	Electrical Power Plants	
2	Lawn Care Mowers	

ANNUAL REPORT FOR 1976

The reporting system of the New Orleans Mosquito Control Board includes a monthly report of our different activities and a cost accounting of the various functions. This annual report is a summation of the monthly reports and it also reflects the new format which was adopted and used throughout this year. The different programs which make up the integrated control approach to mosquito control are reported by different members of our staff who have the responsibility of conducting these programs.

The mosquito control program is going through a period of self-evaluation due to the biological changes of our problems as well as other factors which are having an effect on the efficiency of our operations, such as resistance to certain insecticides and problems of securing permits for source reduction. A research and evaluation section has been programmed to meet this need and is included in this report.

The diversity of our problems was reflected during the year when we had unusual weather conditions, including a summer drought followed by unusually high tides which produced broods of saltmarsh mosquitoes, unlike any we have seen for several years. Extensive control operations were required to maintain control conditions.

A field day on the use of insect growth regulators (IGR's) was held during the spring and seventy-five (75) interested people were in attendance. The training included the formulation of the materials (Altosid® and Dimilin®) on sand to be used as pellets for dry applications and was sponsored by the Zoecon Chemical Co. and the Thompson-Hayward Chemical Co.

Other highlights of the year included the testing of aerial applications of Malathion and Dibrom for Aedes aegypti control in cooperation with the Center for Disease Control; a joint annual meeting of the Louisiana Mosquito Control

Association and the Texas Mosquito Control Association; and the contract use of our DC-3 to treat Plaquemines Parish during the outbreak of Aedes sollicitans.

ENTOMOLOGICAL REPORT

Sustained drought conditions that climaxed in April and September were contributory to a year of extremes in mosquito control at Orleans Parish. The first three months of 1976 accounted for the lowest mosquito light trap collections in the 12 year history of Orleans Parish. Through the first three months of 1976 light trap collections averaged a mere 7.46 adult females per trap night. April was a transition month that began to approach normalcy. May and June light trap collections produced record numbers of adult female mosquitoes. In fact, light trap collections for May and June averaged 188 adult female mosquitoes per trap night. July and August reversed the trends of the previous two months and light trap collections returned to average or below average during those two months. September and October were again reversal months, and light trap collections increased to record numbers. September 1976 was the most active September in the 12 year history of Orleans Parish. October was also a very active month and when added with September averaged 176 adult females per trap night. November and December started the winter season and light trap collections began to reflect the drop in temperature and the increase in wind velocity.

Statistics and raw numbers, compiled from light trap collections, cannot possibly reveal the true picture of mosquito activity in a given locale. A generalization such as the 1976 mosquito Correlation Chart (figure 7) merely illustrates an accumulation of adult mosquitoes, the rainfall totals for the year and the average temperature during the collection period. In spite of the huge numbers of mosquitoes recorded in light trap collections in May and June the mosquito problem

was not as severe as it was in September. May and June light trap collections were peaked by Culex salinarius, a crepuscular mosquito whose flight range and feeding habits detract from its pestiferous character. Salinarius, can be a very severe problem in the areas close to its breeding habitat because of the huge numbers of adults that can accumulate within its flight range. Control efforts were initiated when necessary weather conditions coincided with peak salinarius activity.

The September mosquito peak included large numbers of Aedes sollicitans (salt-marsh mosquito) that were hatched off in spite of the severe drought that culminated in September (see figure 7). High tides in August and September were responsible for the sollicitans peak. September was the most active mosquito control month of the year. Aedes sollicitans were 8% of the light trap collections, 33% of the truck trap collections and 60% of the CO_2 collections. Saltmarsh mosquitoes readily migrate from their breeding grounds in search of a blood meal and this search may compel them to fly many miles in their quest for a victim. Because the saltmarsh mosquito will take her blood meal at any time during the day or night, she is the most pestiferous of all Louisiana mosquitoes. Combine the saltmarsh mosquitoes' biting habits with her extraordinary ability to reproduce and migrate, and that is why September was the most active month of the year.

Culex salinarius (permanent water mosquito) accounted for 74% of all mosquitoes collected by light traps in Orleans Parish in 1976. Aedes sollicitans (floodwater mosquito) accounted for only 3% of the total mosquitoes collected in 1976. A good mosquito control program must have the flexibility to combat permanent water, crepuscular mosquitoes for most of the year, then adjust for a two month struggle with a floodwater, diurnal mosquito. The importance of adequate adult surveillance, treatment evaluation, program appraisal and operational innovation cannot be stressed enough. Overall program flexibility that allows us to identify a problem

and initiate a solution is the key to operational success.

ENCEPHALITIS SURVEILLANCE

Encephalitis Surveillance operations for the year were begun in April 1976 and continued through December. All animal bloods were sent to the State Serology Lab in New Orleans for HI testing to detect Encephalitis antibodies. Since Encephalitis is a mosquito-borne virus which attacks the central nervous system, infected animals produce antibodies against the virus which remain in the bloodstream after the virus has been eliminated.

The highest incidence of positive tests for Encephalitis antibodies was 4.5% in April. Most of these occurred either at Audubon Park or near the western border of Orleans Parish. The number of positives remained below 2% after April until a second smaller peak occurred in July when 2.8% of the samples were positive.

Louisiana reported a total of six (6) cases of St. Louis Encephalitis in 1976. One of these cases was reported in New Orleans. Some of the neighboring states were less fortunate. Mississippi had 26 cases of SLE, while Texas listed 23 cases and Alabama reported 14 cases. These three states accounted for all of the reported deaths due to SLE in the country.

Nine netting locations were selected for use in 1976, and each of these sites was sampled once every two weeks. The purchase of a cannon net made it possible to capture some of the larger indigenous birds such as blackbirds and grackles for which mist nets proved to be impractical. Several walk-in sparrow traps were also used and these were sampled daily.

Figure 1 is a breakdown of the results of Encephalitis Surveillance for 1976.

ENCEPHALITIS SURVEILLANCE RESULTS

LOCATION	TOTAL BIRDS	ADULT SPARROWS	IMMATURE SPARROWS	RED WINGED BLACKBIRDS	BLUE JAYS	OTHER
CITY PARK	2/207	40	2/130	18	6	13
HAYNES	2/157	2/60	80			13
AUDUBON PARK	4/214	1/97	3/116			1
BELLAIRE	6/161	2/50	3/83		10	1/18
FT. PIKE	6/124	4	1/17	4/70		1/33
CHEF & WT.	1/12	5	2			1/5
FAIRGROUNDS	13/262	3/43	10/211		1	7
BEHRMAN PK	5/42	2/14	10		2	3/16
BRECHTEL	10	5	4			1
CARTIER	3/243	1/57	2/181		1	4
IOWA ST.	3/148	1/42	2/105			1
FOCH RD.	1/51	8	1/43			
MISC. TRAPS	126	6	12			108
SENTINEL FLOCK-CHEF	55					55
% POSITIVE	2.5%	2.7%	2.4%	4.5%	0.0%	2.1%
TOTAL	46/1808	12/431	24/994	4/88	20	6/275

POSITIVES/NUMBER OF SAMPLES TAKEN

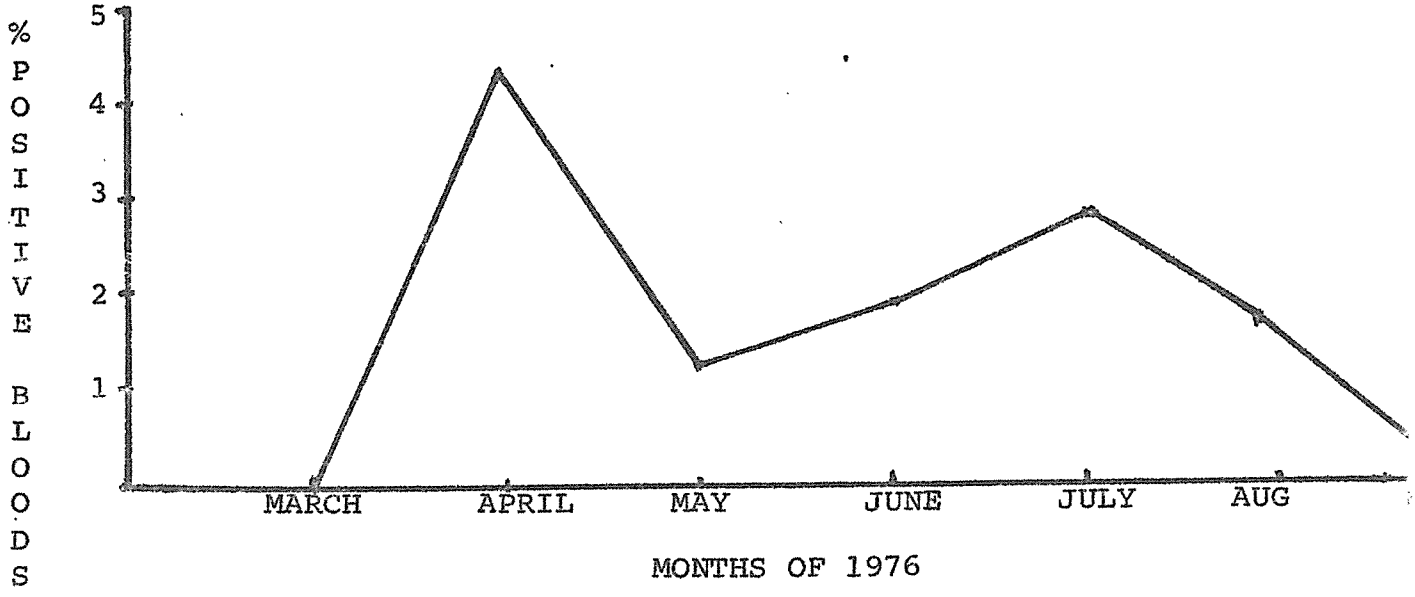


Figure 1

INSPECTION AND SURVEYS

During 1976 over 4,000 sites were checked for mosquito breeding. Nearly 80% of those surveyed were for floodwater species that were located near residential areas, thus posing a quick and noticeable annoyance potential. The remainder of the areas was inspected for permanent water breeding mosquitoes. These are the mosquitoes that cause great annoyance near dusk and dawn, their peak activity times. To treat the larvae that were found required approximately 500 gallons of "T-2" larviciding oil (2 qts. Triton X-45 per 100 gals. #2 diesel). In addition, we began using Altosid SR-10 to treat selected areas. The circumstances seem to indicate that the use of insect growth regulator (IGR) compounds will become more prevalent in the future. During the spring of 1976 an IGR workshop was held. Participating were chemical company representatives, directors of other Mosquito Control districts and personnel from several other parishes. We feel all our employees benefited from this workshop and will be better able to use this new larviciding tool.

New Jersey light trap collections are made twice weekly for the entire year. In previous years we have had to rely on the persons operating the trap to turn it on at the correct time for each run. However, to preclude lost collections because of vacations, etc., this year we have installed 7-day timers that turn the light trap on and off at the correct times. This has increased the number of collections nearly 20% over previous years. In addition to New Jersey light trap collections we use both a truck mounted collecting trap and CO_2 enhanced landing rates to monitor the adult mosquito population. The CO_2 landing rates are used to the exclusion of man biting counts because of the wider spectrum of mosquitoes attracted. This seems to be more indicative of the natural population. We use the truck trap collections primarily as an early warning perimeter defense. The route is so located as to indicate the invasion of a brood of mosquitoes traveling from the

marsh to the populated areas of the city. This usually allows us enough time to use control methods before the human population is severly annoyed.

The threat of encephalitis continued through the year and our surveillance program was in continuous operation. Early positive results in April were quite alarming but dropped to an acceptable level the remainder of the year. This surveillance was used as a guide to better applied control operations.

GROUND ADULTICIDING

We continued this season with the early night treatments (7:00 P.M. - 12:00 midnight), a policy which had been adopted in 1975. This policy was instated to allow our spray trucks to cover more area during the peak activity period of the most prevalent of the pest mosquitoes in our area, Culex salinarius. By putting two trucks in the area to be treated and having each of them treat half, we have found that in our situation we are able to achieve better control.

The C. salinarius population reached a level of annoyance requiring treatment in April. From that time until mid-August our primary targets were C. salinarius and Anopheles crucians. About mid-August a brood of Aedes sollicitans coming from the marsh east and southeast of the populated sections of the city required our attention. This was followed by two broods in September from nearby areas. Nearly the entire last quarter of the year was too cool to require treatment.

A list of expenses for the operations follows: (Figure 2)

Total man-hours	1,088.07	$ 4,544.59
Hours adulticiding	810.70	
Gallons tech. Malathion @ 4 oz./min.	1,284.37	$ 8,228.07
Gallons 10% Dibrom-HAN @12 oz./min.	1,070.99	$ 2,493.10

Total miles traveled	12,977.5	$ 744.81
Miles adulticided	8,097.0	
Total cost adulticiding		$ 16,010.57
Total acres adulticided	294,073.2	
Adulticiding cost/acre		$ 0.054

Figure 2

AERIAL ACTIVITIES

The beginning and the end of the 1976 aerial program was characterized by aircraft maintenance and repair. Our Ag-Cat was fitted with a new trailing edge boom. We did have a major accomplishment with our Ag-Cat operations-wise; a radio system that transmitts and receives fairly well with dependability.

A different operation with our Ag-Cat was the treatment of Moisant International Airport for crane flies to reduce bird annoyance. Our ULV system displayed flexibility by applying labeled high dosage rates of insecticide to reduce the insect population upon which the birds were feeding. This required no modification and only minor adjustments from our normal system.

Total ULV operation was achieved this year for the first time. The results were as expected. Large acreage was treated with low aircraft operating time. Another savings was our aircraft loading cost. This was reduced an appreciable amount when less than 0.5 hours were required by two men to load the Ag-Cat for an adulticiding operation, as compared to one man staying four hours to accomplish the same results.

Our DC-3 had a normal year as compared to past years, except for its use as a photo aircraft. An adaptor was used to mount a camera in the tail section of the aircraft. After several flights a timing and communication technique was achieved to produce usable photos for our permanent control and inspection personnel. The mayor's office, Sanitation and Fire Departments, also found use for

the photographs.

Minor changes were made to our DC-3 spray system. These modifications were for ease of loading, unloading and better maintenance of the spray system.

Adulticiding for Aedes aegypti by air on a massive acreage basis, using two different chemicals (Dibrom and Malathion) was done to determine the most effective operational chemical. Each chemical had to be applied as near to the same time as possible in different areas of the city. The unique system we have in our DC-3 was perfectly suited for this type of operation.

The month of September for 1976 was our most active in so far as aerial operations are concerned (see figure 9). It is interesting to note, that this does not coincide with our highest total mosquito density which occurred in May (see figure 7). However, it appears the dominating factor was the high number of flood-water mosquitoes (3.12% of total light trap collections) which was the reason for our active use of aerial spraying throughout 1976.

Throughout the year our contract pilots demonstrated their ability and depend-ability, but in September they worked week ends, nights and early mornings. It is a great asset to our mosquito control program to have personnel as proficient and willing to do a good job, on a part time basis, as are our contract pilots.

Our Ag-Cat is equipped to dispense liquid or granular larvicide. Since the start of mosquito control in Orleans Parish, we have done aerial larviciding. Due to the availability of insect growth regulating larvicides, our only aerial larviciding this year was done with Altosid SR-10 on sand. This was done on an experimental basis. The Ag-Cat was calibrated to deliver 10 lbs. of Altosand per acre (3 oz. of Altosid SR-10 per acre).

Repairs and Maintenance

Ag-Cat	DC-3
146.0 Hrs.	375.5 Hrs.

Rental Aircraft (Fixed-wing)

Flights	Hours	Cost
44	61.4	$ 1,565.70

Rental Aircraft (Helicopter)

5	9.0	$ 1,125.00

Ag-Cat

93	113.84	$ 9,676.41

DC-3

32	56.65	$ 12,752.25
	Total Aerial Operational Cost	$ 25,119.36

Adulticiding

Mix	Vol.	Hectares
Dibrom 14	2,476.54L	48,508.08
Malathion*	132.30L	298.40

DC-3

Dibrom 14	2,168.35L	39,688.80
Malathion	907.2L	3,852.00

Larviciding

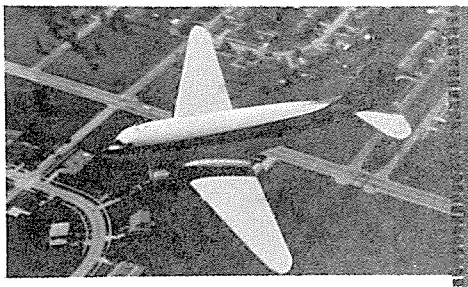
Mix	Vol.	Hectares
None	None	None

* 6 oz./A for Crane Flies

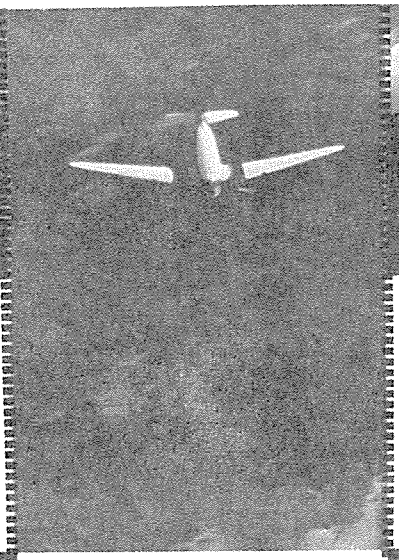
Figure 3

RESEARCH AND EVALUATION

The success of the Research and Evaluation Program at New Orleans Mosquito Control can be measured by the number of projects that were initiated, the variety and complexity of th projects, and the amount of information that was derived from them. In 1977, no less than



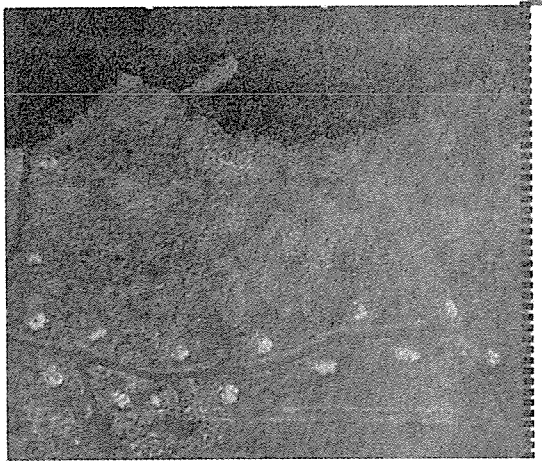
DC-3 PHOTO RUN



DC-3 ULV SYSTEM

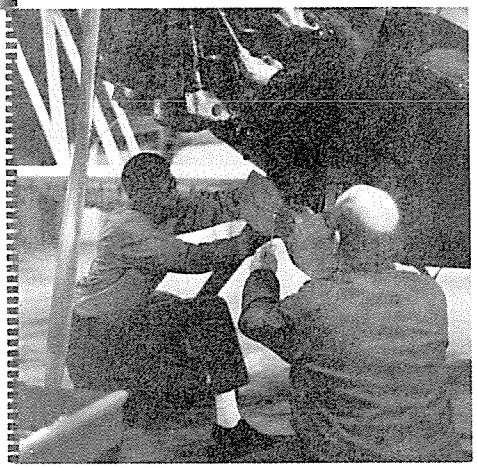
AG-CAT ULV SYSTEM

AERIAL CONTROL

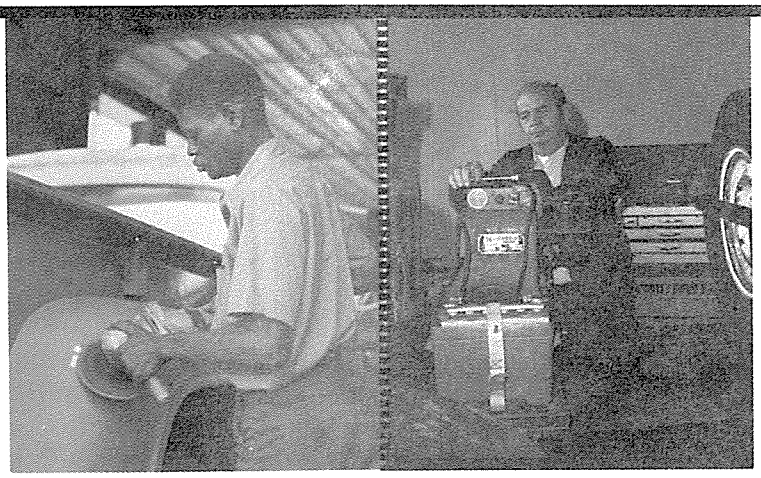


AERIAL MAPPING

MOSQUITO

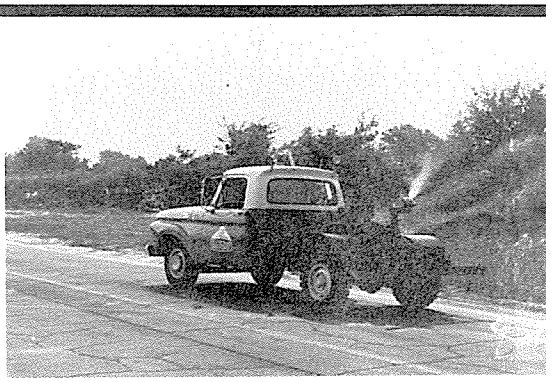


AIRCRAFT MAINTENANCE



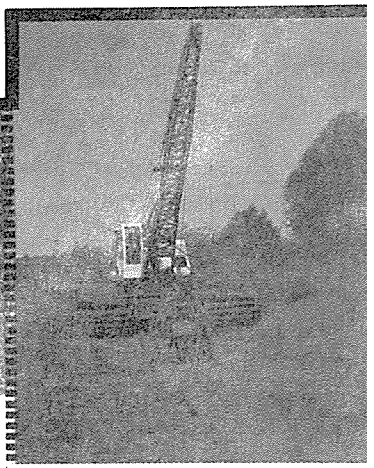
VEHICLE MAINTENANCE

GROUND ULV



GROUND ULV

SOURCE REDUCTION



BACKHOE AND DRAGLINE

fourteen major research and evaluation projects were started, which varied from such areas as testing insect growth regulators (IGR's) for use as larvicides, to developing and perfecting methods of aerial photography using the Douglas DC-3. The data obtained from these projects was considerable, even though some of the projects have not been completed.

One area of increasing concern, especially with the recent epidemics of St. Louis Encephalitis in many parts of the country, has been mosquito reverse susceptibility. Since many species of mosquitoes in New Orleans are potential vectors of disease (Aedes aegypti, Culex quinquefasciatus, Culex salinarius, and others), knowing the degree of resistance of these mosquitoes to labeled pesticides is very important. Many tests were conducted throughout the year to determine this information with a significant degree of success.

Starting in the spring, many aerial treatments, made with the Grumman Ag-Cat, were evaluated. Sampling the natural populations of mosquitoes both before and after treatments indicated that they are still very susceptible to Dibrom 14. More data on the subject was furnished by Dr. C. D. Steelman (LSU). He determined the LC 50 and LC 90 of C. quinquefasciatus larvae collected in New Orleans, to various pesticides. Comparing this year's data with past years indicates an increase in resistance particularly to Malathion (the principle ground adulticide for these mosquitoes). To supplement this information, a program of micro-injecting pesticides into adult mosquitoes to determine susceptibility was initiated. Much of the year was spent in gathering information on the subject, perfecting techniques, and assembling equipment. Baseline data from this project should be accumulated during the 1977 mosquito season.

Another area of our program that has been further developed has been the larviciding activities. Due to the availability of using IGR's on sand to

penetrate vegetation, the Insect Growth Regulator Altosid SR-10 was tested. Test plots were treated, some mistakes were made, some lessons were learned, and so far, the most striking thing learned is the difficulty of evaluating such treatments. Although most treatments made with Altosid in 1976 were on an experimental basis, the information gained and the equipment developed will greatly assist in the implementation of our 1977 larviciding program.

New adulticides are always being evaluated for use at New Orleans Mosquito Control. This past summer, the synthetic pyrethroid SBP-1382 (S.B.Penick Co.) was tested as an aerial adulticide. One treatment was made with the Ag-Cat delivering SBP-1382 at a rate of 0.0035 lbs. of active ingredient per acre. Results indicate that an increase in the number of particles produced is necessary to achieve a more effective kill.

The use of aerial photography from the DC-3 was developed and tested during the year with tremendous success. Developed as a tool for mapping, it has proven useful not only in the inspection program but in source reduction as well.

Work was completed on the constant temperature room for use as an insectory. This will allow the rearing of mosquitoes for future research projects.

AEDES AEGYPTI PROGRAM

During 1976 oviposition surveillance of Aedes aegypti continued to show increases in the number of positive ovitraps and in the number of eggs oviposited. The number of positive cemetery-based ovitraps remained constant (13%) while premise and riverfront ovitraps showed increases in the number of positives (4% increase for premise traps and .5% increase for riverfront traps). In addition, house-to-house inspections revealed a 3% increase in the number of positives.

This was the second complete year of surveillance, allowing comparison of 1976 statistics with baseline information established during 1974 and 1975. The

Saint Vincent de Paul and Saint Roch areas remained highly infested while noticeable changes occurred in other areas. A slight decline in activity was observed in the French Quarter this year (9% positive and 767 eggs during 1975 as compared to 8% positive and 683 this year), while dramatic increases occurred in the Algiers area (19% positive and 3,369 eggs during 1975 as compared to 33% positive and 5,614 eggs this year). Substantial increases were also reflected in the total number of eggs collected for all surveillance zones combined (22,814 during 1975 as compared to 39,505 this year).

Because of the detected proliferation of "gyps" in Algiers this year, this area was chosen as the site for numerous field tests. Ground adulticiding was conducted regularly after the first and any succeeding positive was detected in the oviposition zone. Using this method, oviposition data revealed little consistency in control. During September, an aerial ULV adulticiding test using O.P.M.C.'s DC-3 aircraft was conducted to compare the effectiveness of such treatments using Dibrom and Malathion. Caged A. aegypti and daily ovitrap surveys were used as evaluation tools. Although unfavorable weather conditions hampered the operations, Malathion appeared to be slightly more effective than Dibrom. Further testing will be conducted during 1977.

Evaluations of A. Aegypti adulticiding have proven difficult because of limited information obtained from LBJ survey data. Tests conducted using the "Fay" trap [Mosquito News 30(1): 20-30], revealed promising results on adult captures. Hopefully, this tool will be implemented in future test evaluations.

Public relations efforts during 1976 revealed a relaxed attitude by the public concerning the A. aegypti problem. Plans are now underway to concentrate on and evaluate this aspect of the A. aegypti program during 1977.

INSPECTIONS: (LBJ's inspected)		% Paddles Positive:
Cemetery	4,535	13%
Premise	6,581	16%
Riverfront	1,746	1.5%
House-to-house inspection	681	12%
Junkyard	6	
Ovitraps in operation	276	
Total paddles collected & read	12,622	13%
Total paddles found positive	1,660	
Total Aedes aegypti eggs	39,505	

MAN-HOURS	HOURS	COST
Inspection	3,686.5	$ 14,893.46
Office	1,585.0	6,403.40
Miscellaneous	1,027.5	4,151.10

TRAVEL	MILES	COST
Vehicles	26,259.5	$ 1,312.98
Trailbikes	1,892.2	18.92

TOTAL COST
$ 26,779.86

Figure 4

SOURCE REDUCTION

Despite a slow start, we were able to effectively eliminate approximately 258 acres of mosquito breeding habitat in Orleans Parish during 1976.

The amphibious dragline and the two backhoes were not used in January. The dragline was idle while our permit application to the Corps of Engineers to continue source reduction work in the wetlands was being processed. The backhoes were not used due to their poor mechanical condition. Because of this condition we requested two new backhoes for the 1976 season. A field demonstration to select these new backhoes was conducted in eastern New Orleans. The demonstration, under actual mosquito control conditions, clearly showed the John Deere 310 backhoe to be

superior. Based on the results of the demonstration, and the local parts and service facilities, we decided to purchase two new John Deere 310 backhoes. While waiting for delivery of the new machines we used the old machines, to complete area U-11. This area of 97 acres is located in eastern New Orleans approximately 8 miles from the central city area (see map). During construction of the U-11 project a serious situation occurred. Because of a communication breakdown, an electrical cable was dug up and broken. No one was injured. However, the weakness of our utility clearance system became apparent. Since that experience we have developed a new system requiring on-the-site consultations with the utility companies before digging is begun. The new system has worked very satisfactorily.

Since our permit from the Corps had not been received, we decided to move the draglineinto an area where no permit was required. The area, X-10, X-14 is west of and adjacent to the area where the machine was working. This is an old source reduction project area which, because of fire-fighting activities, had reverted to a mosquito breeding site. We had completed approximately 90% of the X-10 project when we received our permit from the Corps of Engineers to continue our project in the wetlands. The permit came after seven months of meetings, environmental assessments, phone calls to elected public officials and red tape. Even though the permit process was lengthy, all of the agencies involved (Corps of Engineers, Louisiana Wildlife and Fisheries, U. S. Fish and Wildlife Service, National Marine Fisheries) were very cooperative. Because of the increased communication between all agencies concerned during the permit process I feel we have a better understanding of and working relations with these agencies. This experience should make future communications and requests for permits much easier. Since receipt of the permit we have completed approximately 75% of the X-26 project. Our purpose in the X-26 project area was to construct access ditches through the fringe area. This is the

interface where the low, wet marsh meets the higher dry roadside or levee. This is an area of high mosquito production because of the fluctuating water level and lack of mosquito predators. Our ditches were dug to connect this fringe to the main water system in order to give the mosquito predator access to these previously isolated areas. Because of the delicate nature of the marsh community we have been doing some environmental impact studies in the area. We are monitoring the mosquito breeding in the marsh adjacent to the access ditches and in the marsh away from the access ditches. We also record the water level in the area and have taken color slides of the marsh vegetation adjacent to the ditches. This information will aid us in evaluating the impact of our ditches on the mosquito breeding and marsh vegetation in the project area. Drought conditions during late summer all but dried the area, killing many of the mosquito predators.

Our access ditches during this period showed approximately 18" of water in the ditches, even though most of the natural ponds and streams were dry. Many minnows and aquatic animals were found throughout the ditch system. The access ditches acted as reservoirs for the mosquito predators and helped to repopulate the drought affected areas when the water level returned to normal. As of the end of December this project is about 75% complete, with completion expected within the next 30-40 working days.

Backhoe operations during the year were divided between City Park and the Little Woods area. The Little Woods area is located 5-10 miles northeast of the central city area. City Park is within the central city area. Work in the Little Woods area consisted of ditching through swales in wooded undeveloped land. These ditches were then connected to the drainage canals in the area. The grade in these ditches is maintained by using the water level in the ditches as a guide or by following the stratification of the subsoil. This can be done by the operator from

the machine. However, work in City Park required a different technique. The problem in City Park was the numerous swales throughout the picnic areas. These areas are for the most part well cared for picnic grounds, but after heavy rains the swales fill with water and produce large broods of mosquitoes. To eliminate this problem we had to carefully grade the ditches from their beginning to the drainage point. This operation required three men for each machine; the operator, one man to shoot the grade with the transit and one man to hold the stadia rod. This was a time consuming job and quite different from anything we had done previously. Work in the City Park area was done so professionally that the park manager called our director to express his appreciation for the way the work was performed. We also worked with park officials to eliminate a solid waste problem on Nursery Island. The island had been used as a dump for solid waste, after the park's incinerator broke. To eliminate the problem we dug trenches on the island and buried as much of the trash as we could. Park officials now plan to cover the island with a layer of top soil. Once this is done grass will be planted and the island can again be used for recreational purposes.

In August we received delivery of our new marsh buggy. The buggy has a ground pressure of less than 2 lbs/sq in., thus enabling it to go virtually anywhere. The hydraulic drive system makes manuvering the machine very easy and eliminates most of the maintenance problem of conventional steering. The buggy can be used as a personnel carrier for inspection work, or it can be adapted with a hydraulically driven rotary ditcher for source reduction work. The addition of this piece of equipment will increase our marsh inspection and source reduction capabilities immensely.

The early onset of winter all but stopped our field operations. Because of the location and nature of work, rain, cold and windy weather makes working

conditions impossible. During these periods we repair our equipment, update our photographic and project records and assist other departments at mosquito control.

Our source reduction project schedule for 1977 has been compiled and work will begin as soon as the weather permits. The new equipment which we have received and the new procedures we are following will help us to contribute even more to the overall mosquito control program in 1977.

	Backhoe	Dragline
Total hours	712	363
Digging hours	363	190
% Digging time	51%	52%
Linear ft.	23,512	14,308
Cost of fuel	$ 71.53	$ 87.37
Miscellaneous cost	$ 18.84	$ 139.01
Salary	$ 5,429.96	$ 3,376.11
Total cost	$ 5,520.33	$ 3,602.49
Cost/ft.	$ .23	$ .25
Cost/cubic yd.	$ .69	$ .55
Feet/hr.	65	75

New acres under some form of Source Reduction - 258

Figure 5

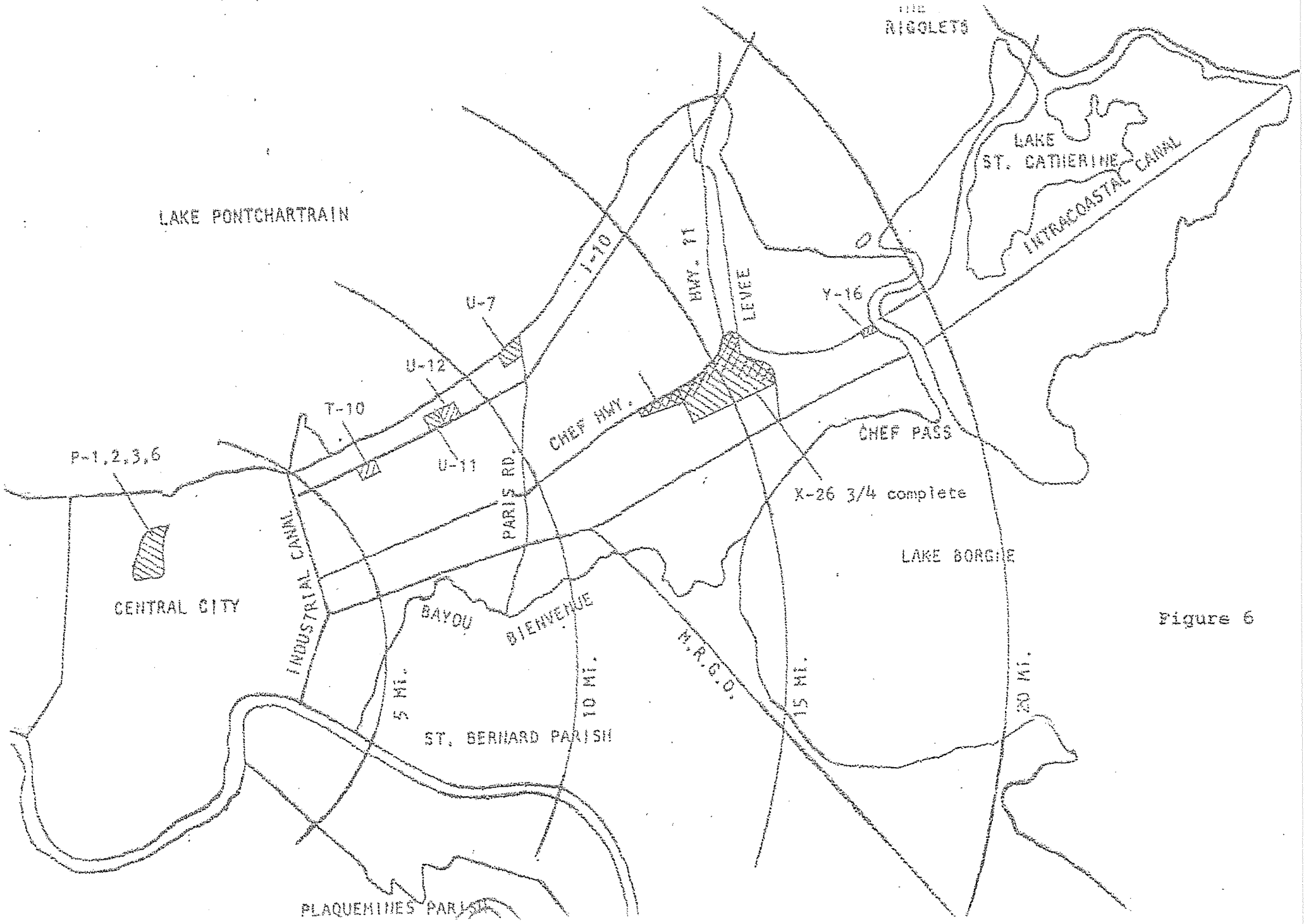

RIGOLETS
LAKE ST. CATHERINE
INTRACOASTAL CANAL
LAKE PONTCHARTRAIN
I-10
HWY. 11
LEVEE
Y-16
U-7
U-12
T-10
U-11
CHEF HWY.
PARIS RD.
CHEF PASS
P-1,2,3,6
X-26 3/4 complete
LAKE BORGNE
INDUSTRIAL CANAL
CENTRAL CITY
BAYOU BIENVENUE
M.R.G.O.
5 MI.
10 MI.
15 MI.
20 MI.
ST. BERNARD PARISH
PLAQUEMINES PARISH

Figure 6

1976 Mosquito Correlation

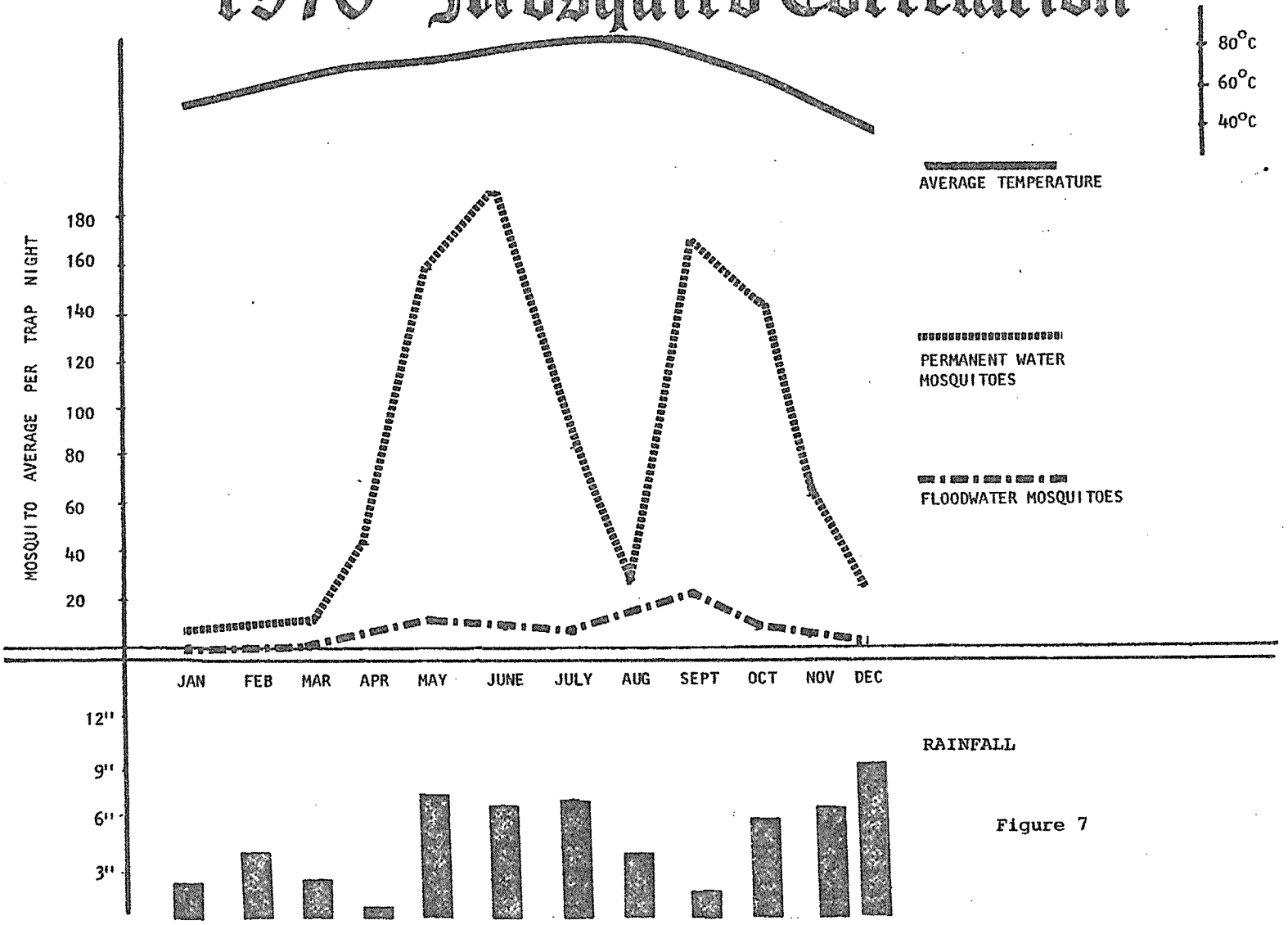


Figure 7

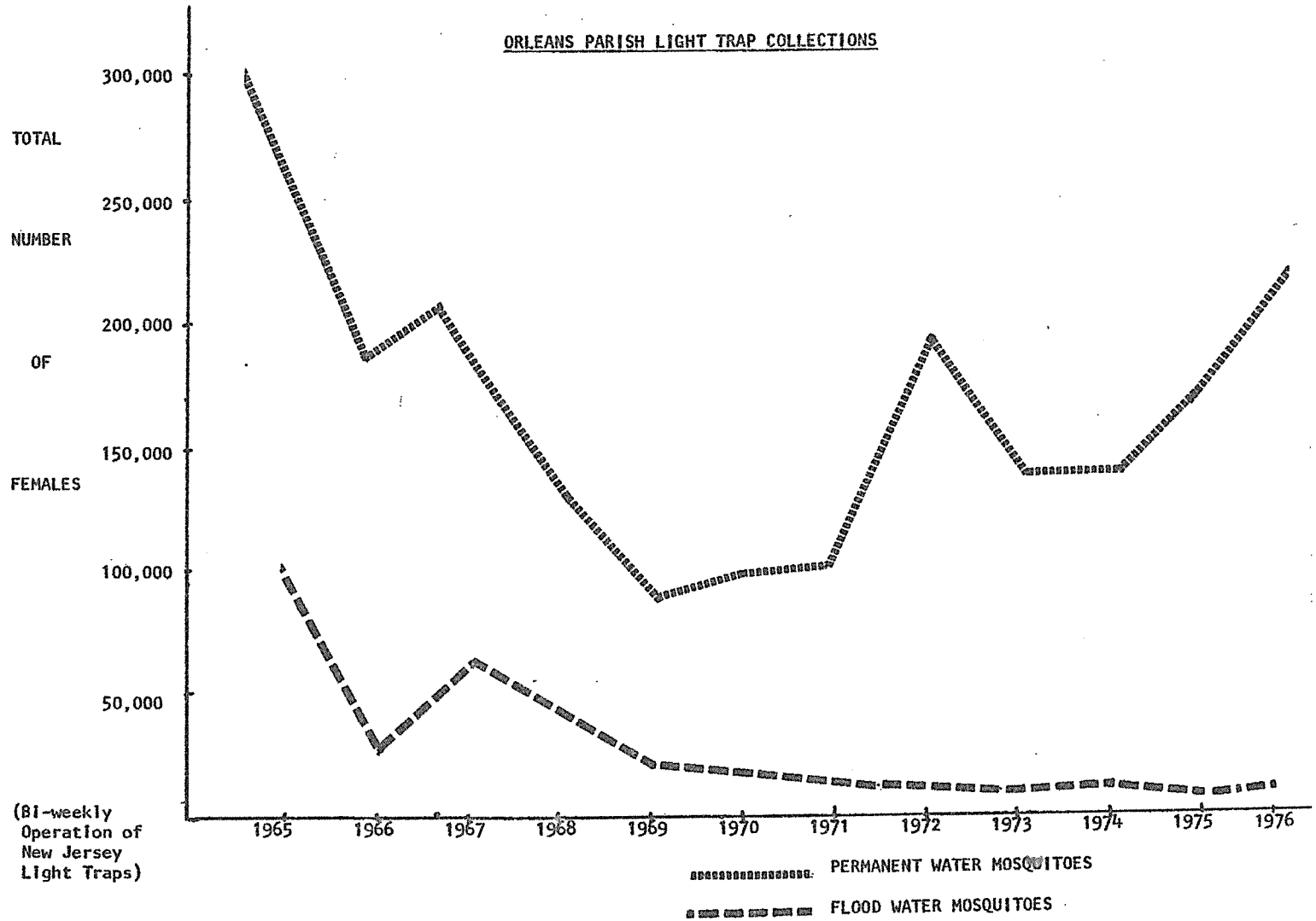

ORLEANS PARISH LIGHT TRAP COLLECTIONS
TOTAL NUMBER OF FEMALES
300,000
250,000
200,000
150,000
100,000
50,000
(Bi-weekly Operation of New Jersey Light Traps)
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
PERMANENT WATER MOSQUITOES
FLOOD WATER MOSQUITOES

Figure 8

AERIAL ADULTICIDING CORRELATION
1976

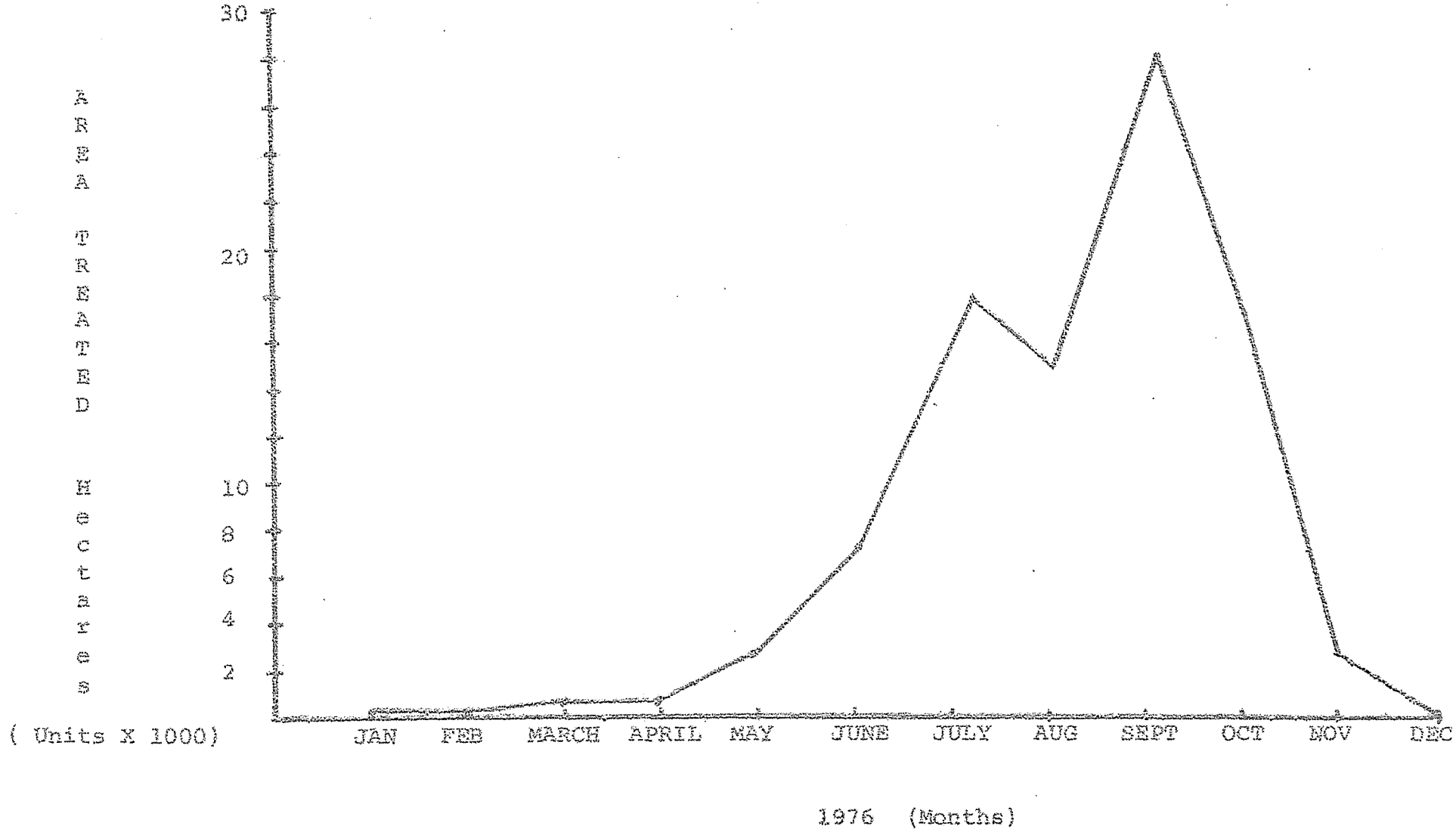


Figure 9

MONTHLY ACCUMULATIVE RAINFALL

	82 yr. AVERAGE RAINFALL	ACCUMULATIVE AVERAGE	1976	TOTAL TO DATE	DEVIATION FROM NORMAL
JANUARY	4.19	4.19	2.23	2.23	- 1.96
FEBRUARY	4.55	8.74	3.75	5.98	- 2.76
MARCH	5.03	13.77	2.81	8.79	- 4.98
APRIL	4.81	18.58	0.80	9.59	- 8.99
MAY	4.72	23.30	6.71	16.30	- 7.00
JUNE	5.27	28.57	6.22	22.52	- 6.05
JULY	6.65	35.22	6.45	28.97	- 6.25
AUGUST	5.92	41.14	3.46	32.43	- 8.71
SEPTEMBER	5.66	46.80	1.68	34.11	-12.69
OCTOBER	3.14	49.94	5.63	39.74	-10.20
NOVEMBER	3.32	53.26	6.05	45.79	- 7.47
DECEMBER	4.77	58.03	8.71	54.50	- 3.53
	58.03				

Figure 10

LIGHT TRAP COLLECTIONS — Figure 11 — DATE 1976

	TOTAL		AEDES		ANOPHELES		CULEX							
	MALE	FEMALE	SOLL.	VEX.	CRUC.	QUAD	QUINQ	SAL.	U (sp)	Cs 1	M p	C r	P(sp)	other
1. Low Algiers	1187	24,208	30	494	2075	515	2	19,606	989	173	51	28	87	158
2. Mid Algiers	142	1338	2	91	37	21	5	1036	114	13	1	13	1	4
2A.Mid Algiers	133	3183	5	173	148	12	2	2673	53	64	12	35	4	2
3. Up. Algiers	109	2522	5	175	39	2	6	2224	11	34	0	15	0	11
4. Benton	214	504	13	78	12	2	2	358	18	7	0	3	4	7
5. N. Roman	111	264	4	73	9	1	1	157	6	1	0	3	1	8
6. Irish Chann.	202	506	6	150	16	3	0	259	26	11	1	17	1	16
7. Napoleon	94	173	2	51	10	2	5	75	16	1	0	7	0	4
8. Audubon	134	497	20	90	20	11	7	295	24	12	0	9	5	4
8A.Audubon	120	580	45	116	29	7	1	249	13	11	6	4	90	9
9. City Park	187	706	6	121	31	12	5	476	14	6	3	18	3	11
9A.City Park	213	1265	2	338	106	16	1	732	35	3	3	18	2	9
10. Lakewood	915	2834	26	657	88	12	1	1893	77	51	4	18	3	4
10A.Lakewood	144	1036	5	379	32	3	2	513	14	23	9	47	0	9
11. West End	1765	3247	43	329	104	11	0	2389	257	51	17	27	6	13
12. Loulsville	181	543	2	134	19	4	1	317	39	19	2	6	0	0
13. Cameron	318	752	2	192	43	9	0	413	47	15	2	23	3	3
14. Lafreniere	55	189	2	61	4	4	4	89	3	6	0	12	2	2
15. Gentilly E.	40	125	5	26	17	0	1	57	13	0	0	3	0	3
16. Lake Airp.	516	1863	18	494	50	18	1	1089	55	35	16	33	44	10
17. LittleWoods	956	43,834	309	2374	1797	432	7	37,181	366	317	849	48	42	112
18. Vil.del'Est	181	2324	46	395	118	29	0	1438	86	57	105	19	9	22
19. Bienvenue	252	7883	106	591	252	47	1	6524	157	24	109	13	9	50
20. Michoud	189	46,794	3115	1040	761	277	0	40,125	169	511	498	5	102	191
21. Powers Jct.	303	16,963	815	370	3027	138	0	8627	3241	115	219	11	83	317
22. So. Shore	395	7312	235	40	1927	86	9	4555	89	120	196	7	2	46
23. Chef Menteur	4076	40,495	784	269	9495	107	0	28,936	555	119	23	10	11	186
24. GreensDitch	996	25,230	1062	129	5950	128	1	16,943	485	459	1	1	35	36
25. Rigolets	584	11,589	1044	173	4589	151	0	5180	186	172	24	20	33	17
TOTAL	15,126	248,759	7759	9603	30,805	2060	65	184,409	7158	2430	2151	473	582	1264
PERCENT %			3.12	3.86	12.38	.83	.03	74.13	2.88	.97	.86	.19	.21	.51