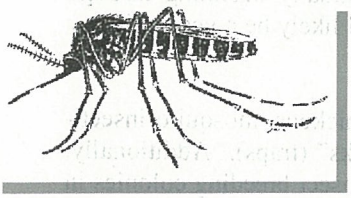
NEW ORLEANS MOSQUITO & TERMITE CONTROL BOARD

ANNUAL REPORT 2004*



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NOMTCB ACTIVITIES SUMMARY
MICHAEL CARROLL

HAPPY 40TH ANNIVERSARY!

A wall of fog will meet any mosquito invasion which may threaten the peace and harmony of New Orleans. Dr. Rodney C. Jung, city health director, said today an agreement has been reached between Florida and Louisiana to bring fogging equipment and personnel from the Lee County Fla., Mosquito Control District for open warfare against mosquitoes. (T-P 5-14-64). *Mayor Victor H. Schiro, at a special session in his office, announced the hiring of* (George) *Carmichael* (as Director) *at an annual salary of approximately $14,000.* (T-P 5-21-64). *The city of New Orleans needs mosquito control inspectors, men 18 to 30 in good physical condition who like outdoor field work, can swim... (And don't mind being mosquito bitten.)* (T-P 6-25-64). ***Official Bares 'War" Devices**—What with mosquito control traps, rain gauges, human hands for testing and fogging trucks, it looks like curtains for New Orleans Mosquitoes.* (T-P 6-25-64). *Carmichael said the biggest need right now is a temporary location from which to operate. He needs some sort of garage "or anything that will house six to eight vehicles and allow for a small amount of office space. "It is a little hard to operate from the eighth floor of City Hall." Carmichael's office is presently squeezed into Health Department quarters in an area mostly devoted to filling cabinets.* (T-P 7-6-64). *A 1965 operating budget of $473,676 was recommended for the city's mosquito control program today, but the administration has budgeted only $100,000... City Councilman Daniel Kelly announced Friday he plans to ask the Orleans Levee Board to contribute $300,000 to help purchase mosquito control equipment for the city.* (T-P 10-28 & 11-17-64).

From the mosquito aspect of our program, West Nile virus transmission continued to decline in 2004, with only one possible human case reported. During the first year's activity in 2002, there were 22 cases, followed by four human cases in 2003. Positive sentinel chickens and dead birds showed a similar decline. A program of preemptive adulticiding, begun in 2003, appears to be having an effect in breaking the transmission cycle. The theory behind this approach is to break the arboreal bird-mosquito cycle in early spring, as well as to suppress the spring F1 and F2 general mosquito populations.

In August, attention was focused on several large broods of *Mansonia titillans*. In New Orleans, this species is almost exclusively dependent on the floating aquatic weed, water hyacinth. The larval and pupal stages attach their breathing

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MOSQUITO FIELD OPERATIONS

Steve Sackett

West Nile virus transmission in New Orleans showed a marked decrease in 2004, as only one New Orleans resident was diagnosed with the illness. Cases of WNV in 2002 and 2003 were 22 and four, respectively. As in 2003, ground and aerial adulticiding treatments were initiated in the spring in hopes of reducing the bird-to-bird virus transmission before it spilled over into the human population. Many of these control measures were focused in areas that experienced high WNV activity in 2002. Possibly early intervention played a role in reducing the number of human cases in New Orleans; significant efforts were put forth to minimize mosquito populations early in the year.

Nineteen wild birds submitted to the state lab were found to be positive for WNV, compared to 21 positives in 2003 (no data was available from the state for 2002 birds). Table 1 illustrates the number of positive wild birds by month.

Table 1.

January	**1**	**July**	**1**
February	**1**	**August**	**0**
March	**2**	**September**	**2**
April	**2**	**October**	**6**
May	**0**	**November**	**2**
June	**0**	**December**	**2**

Much of our personnel's time was devoted to residential inspections and treatment of container-breeding mosquitoes. *Aedes albopictus* and *Culex quinquefasciatus* maintained their status as our primary pest/vector mosquitoes, but source reduction efforts coupled with residual sprays and standard adulticiding treatments kept their populations from getting out of hand in most areas.

In August, attention was focused on City Park and several adjacent areas which were inundated with a relatively unknown species of mosquito, *Mansonia titilans*. Like its cousin, *Coquillitidia perterbans*, the larvae and pupae of *Ma. titilans* possess sharpened structures on the air tubes and siphons that allow them to puncture the underwater roots and stems of aquatic vegetation and pass the majority of their aquatic stages underwater. The adults are aggressive biters with a flight range of several miles. The lagoons in City Park are once again choked with water hyacinths that are serving as the host plants. The Hyacinth Division of the Louisiana Wildlife and Fisheries was called in to reduce the hyacinth problem, but it appears that multiple herbicide treatments may be necessary to eliminate this major mosquito breeding habitat. Several samples of *Ma. titilans* were sent to the state lab for WNV testing, and all were found to be negative. An unusually warm winter kept our spray operations active until early December, as winter rains hatched off several significant broods of *Aedes vexans*.

The buck moth survey was completed for 2004 as 200 oak trees in four areas were monitored for caterpillar activity. Caterpillars were noted in 84% of the trees as compared to 35% for 2003. The following chart illustrates the percentage of oak trees positive for caterpillars over the past ten years and the average number of buck moths captured in pheromone-baited sticky traps for the past four years. It appears that the winter moth captures may be a decent predictor of the spring caterpillar population.

BIOLOGICAL CONTROL LAB
Greg Thompson

The biological control staff spent much of their time maintaining or preparing for the City of New Orleans's encephalitis surveillance program (See Encephalitis Surveillance Annual Report). These activities have become of even more importance since the arrival of West Nile Virus in our area.

We spent much of January and February reestablishing our research colonies of mosquitoes. The previous colonies were found to contain more then one species of mosquito. This colony contamination was almost certainly the result of impregnated female mosquitoes escaping from their own colonies and laying eggs in the larval rearing trays of other colonies. The escapes occurred due to the age of our cages which despite constant repair sometimes no longer maintained their integrity. This problem was solved through the purchase of new cages and the inspection of several generations of mosquitoes produced from stored eggs.

Encephalitis surveillance, which began in spring, required lab staff to spend all or part of four days each week in the field collecting blood. In order to collect these samples, staff needed to visit sites located in nearly every neighborhood of New Orleans twice a week. We took advantage of all the driving and as we covered our route to conduct field experiments and collect samples for two very important research projects.

The first project involved collecting mosquito eggs from different neighborhoods, rearing them into adults and then exposing them to one of the pesticides used for mosquito control. The purpose of this research was to determine whether the mosquito population in local areas or even city-wide had developed resistance to the chemicals commonly used for their control.

The procedure for testing for pesticide resistance involved coating the interior surfaces of bottles with one of the chemicals and then introducing into the bottles adult mosquitoes reared from the eggs collected at each site. The bottles were capped and the insects observed to see how long or if at all it took the pesticide to kill the insects.

The mosquitoes were assumed to be resistant if it took an extended period of time for them to die when compared to the time it took for mosquitoes known to be non-resistant to die. When mosquitoes from any site appeared to exhibit resistance, more eggs were collected from that site and shipped overnight to the Centers for Disease Control in Fort Collins, Colorado. Dr. Janet McAlister, formally with the NOMTCB and now with the CDC, has plans to again test mosquitoes from the collection site for resistance but using a different method.

Data obtained from these continuing tests, when combined with actual field tests of spraying under natural conditions will give us definitive proof of whether resistance to a pesticide has developed in a mosquito population. Furthermore, comparison of the data from the different tests will give us knowledge of whether the results obtained from one test is consistent with the results obtained in the other tests,

A second project that was dovetailed with the encephalitis surveillance and pesticide resistance work was continuing research to determine which qualities of a water-holding container are the most attractive to ovipositing female mosquitoes. Dr. Gerald Marten, who at one time headed the bio-lab before accepting a teaching position in Japan, visited us in August and is helping to guide this research. His visit both invigorated and focused our research activities.

The goal is to create a water-filled container that is so attractive to ovipositing female mosquitoes that they will preferentially select these containers in which to lay their eggs.

We hope to greatly impact the reproductive success of backyard breeding mosquitoes by combining these attractive qualities with a mechanism in the container

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ENCEPHALITIS SURVEILLANCE
Greg Thompson

We placed caged chickens at twenty locations scattered throughout the city of New Orleans. Blood drawn from the birds was sent to the laboratory at Louisiana State University to be tested for the antibodies that a chicken's immune system forms in response to an arbovirus infection. Monitoring these chickens for arbovirus exposure remains the major component of our arbovirus surveillance efforts.

We have, in the past, always drawn blood samples from one or more chickens at each site each week. This year, we sent in blood samples only every other week based on a new practice by the state of Florida. Bi-weekly bleeding is done until the first positive shows up, then weekly bleeding is initiated.

The winter is still the quiet season for arbovirus activity. The chickens were both this year and usually in past years placed in the field at the beginning of May and removed from the field at the onset of cool weather. We are trying to determine if this time line could usefully be altered to monitor West Nile virus (WNV) activity year round. Our other encephalitis-causing viruses such as Saint Louis encephalitis (SLE) and Eastern Equine encephalitis (EEE), after the onset of cool weather, do not cause human cases and are not even detectable in birds. Human cases and birds testing positive for infection with WNV occur, although at greatly decreased levels, even during cold weather in Louisiana. An excellent example of the virus cold hardiness was the human case recorded in Louisiana in early December of 2003 after a month of cool to cold weather.

Our surveillance monitoring from this year provided additional proof of the virus' ability to infect as long as the weather is warm enough for mosquitoes to blood feed. Across the state, more than one-hundred human cases occurred and the sampling of chickens, wild birds and mosquitoes recorded wide-spread viral activity. In New Orleans, despite all the statewide activity and the presence of positive dead wild birds in the city, from May through mid-November, only one chicken tested positive for exposure to WNV.

We made the decision to remove the surveillance chickens from the field at the end of November. We had had only one chicken test positive in the entire season and very cool weather arrived in early-November. For these reasons, we were extremely surprised that among the final blood samples from the chickens taken on November 29 as they were being removed from the surveillance sites was our second positive for WNV.

Chickens testing positive for WNV have provided an excellent early warning of future human cases in New Orleans each year. The single mid-season positive chicken actually once again provided an early warning of the only confirmed human case of WNV in New Orleans. The human case occurred approximately two weeks after single chicken tested positive during the summer months.

It will take more years of monitoring to determine whether this low reported infection rate in our chickens represents the future or whether it was an anomaly.

Arbonet, the internet site for reporting and sharing arbovirus activity in Louisiana, was much improved during the year. The GPS coordinates of all arbovirus monitoring sites, such as where surveillance chickens are located and mosquito pools are collected throughout the state, are now part of its' data base. This will make mapping of arbovirus activity easy.

SOURCE REDUCTION
Brooks Hartman

For 2004, the Source Reduction program was active again in New Orleans East with the clearing of trash and debris along the perimeters of the P-2 area located in the East Shore Subdivision at Paris Road and Hayne Blvd. We were also working in the Area R-1 located south of Chef Menteur Highway, north of Old Gentilly Road, east of I-510.

In addition, the S-3 area (Wright Road, Lake Forest Blvd., Berg Canal and North Idlewood Court) is overgrown with dense vegetation. Work in this area has been on hold because of the placement of underground utilities along Wright Road by a private contractor blocking entry to the work area.

Another area of much concern during 2004 and upcoming for 2005 is the M-2 area (west of London Avenue Canal bordered by Virgil Blvd. and Van Drive). The area continues to drain through a 6" pipe via drainage through the Gregory Jr. High School property. The Department of Public Works has secured a completed bid from Boh Brothers Construction Company for the installation of a catch basin on Van Drive which will allow us to install a 12" diameter or larger pipe into the M-2 area securing complete drainage of the area. We are looking forward to working on this long awaited project during 2005.

We will continue to report on the progress and monitor all Source Reduction projects before and after work is complete.

Additionally, Source Reduction personnel were assigned to shop duties and assisting the Plant Maintenance Supervisor with in-house facility maintenance.

TERMITE ENTOMOLOGY
ED FREYTAG

Our office and laboratories require computers and printers to conduct day-to-day activities such as analyzing data, writing reports, searching the internet for information and communicating via email. Unfortunately, the more computers we have, the more they seem to break down. Since we do not have a person in our staff dedicated to work on the computers, I spent a lot of time fixing worm and virus infections, replacing hard drives, fixing Windows operating systems that crashed, and overseeing communications hardware and software. With the help of MIS (Management Information Systems, located at City Hall), I have been able to maintain the computers and printers working reasonably well throughout the year. I also prepared photography and video clips requested by various agencies such as National Geographic.

The audio-video office was completely gutted out and renovated to improve the working and storage space. Computers, as well as video, photography, and infrared inspection equipment has been installed and organized in the new cabinets. Old equipment no longer working or compatible with the new systems was removed and declared surplus and will be sold.

USDA- Operation Fullstop Activities

We assisted the USDA Operation Full Stop program in the French Quarter with infrared inspections of buildings treated during the initial phase of the program. Many of these buildings, such as the Omni Orleans Hotel, the Supreme Court building and the Main Fire station on Decatur were difficult and tedious to complete due to the size and complexity of the structure. Live Formosan subterranean termites were found in many of the buildings that we inspected, and the results were forwarded to USDA for data analysis. I designed a data

base using Filemaker Pro to standardize data entry and to facilitate the data queries requested by USDA personnel. All infrared inspectors were required to use the new program which prevented errors due to re-entering and interpreting data because many different programs were used previously.

USDA asked us to treat the trees around the Supreme Court building (formerly known as the Wildlife and Fisheries building). Using the Videoprobe to look inside the trees, we found a live oak infested with Formosan subterranean termites. All the suspect trees were treated using Termidor liquid termiticide by injecting a foam solution into the tree trunk and soil treatment around the roots. Post-treatment inspections by LSU personnel found no further termite infestations on the treated trees.

Cooperative Research with Chemical Industry Companies

Bayer Crop Science

The second phase treatment of the Administration building at the Audubon Zoo was finally completed in January. A full perimeter treatment was conducted including two sheds around the loading and receiving dock area. Several Formosan termite trails were discovered along the building where the gravel was piled high against the wall, covering the weep holes. An infrared inspection was conducted on the inside walls but no termites were found because access was limited.

Soil samples were collected from all the buildings treated with Premise (imidacloprid) at the Audubon Zoo to determine soil type and insecticide concentration (parts per million). I assisted Chip Anderson of Bayer Environmental Science in collecting the samples using a metal coring device with a plastic insert. Chip delivered the samples directly to their laboratory.

An Arizona ash with a large Formosan infestation inside was treated with Premise termiticide at 2244 Jay St. to determine how this material affects a colony from a single treatment point. We saw a decrease in activity over time from the treatment site to at least fifty feet away. The colony was

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TERMITE RESEARCH
Claudia Riegel

The hard work of the termite team at New Orleans Mosquito and Termite Control Board has allowed 2004 to be a fun and productive year. The members of the team include: Barry Lyons, Ed Freytag, Aaron Mullins, Perry Ponseti, Gus Ramirez, and Barry Yokum. I appreciate their hard work and attention to details.

City Properties

City properties and historic trees at City Park that have a termite treatment managed by New Orleans Mosquito and Termite Control Board had little to no problems during this year. The stations around the buildings are checked every month. Full termite inspections were done at the Cabildo, Presbytere, Pharmacy Museum, City Hall, Civil Court Building, Gallier Hall, Nix Library, Upper Pontalba Apartments, City Hall, Civil Court building, and others. There were no signs of active termite infestations in all the inspected buildings except the Upper Pontalba Apartments and Gallier Hall. Many of the sites have had termite activity in bait stations outside the structure. Formosan termites were found in bamboo in a courtyard of the Upper Pontalba Apartments and a Formosan subterranean termite infestation was found in the attic of Gallier Hall during a yearly interior inspection. Eleven above-ground bait stations containing 0.5% noviflumuron was installed in the attic to treat the termite infestation.

The operational research conducted at the Nix library on Carrollton Avenue, City Hall, and Civil Court building was finished and New Orleans Mosquito and Termite Control Board will continue to service the property as a commercial sites. On September 29 and 30, 2004 a termite inspection was completed at City Hall and on October 5, 2004 a termite inspection was completed at the Civil Court building. Studies were initiated at the City Hall and Civil Court in 2002 and at that time, there was an active infestation on the first floor of the City Hall. In addition, many of the trees in the garden area at the back entrance of City Hall was infested with Formosan subterranean termites. Many termite colonies have been eliminated around both buildings and the termites in City Hall were eliminated. During the inspection, old termite damage was found in a window frame in the Civil Court building. The stations around the building will be checked monthly.

Operation Full Stop

New Orleans Mosquito and Termite Control Board (NOMTCB) has continued to inspect properties in the French Quarter for Operation Full Stop. All reports have been sent to the USDA-ARS. Inspections of structures in the French Quarter were scheduled throughout the year. The sizes of the building varied from a hotel with several hundred rooms to smaller two, three, and four story structures. New Orleans Mosquito and Termite Control Board (NOMTCB) was involved with all aspects of the inspection from scheduling with the property owners and the pest control professional managing the termite contract to doing the inspections and writing the reports that are submitted to the USDA. Theses inspections were rigorous and involved the use of the infrared camera and PestFinder. Total access of the property was needed and all areas of the property are inspected visually and with the infrared camera. If an area was suspect to have termite activity, the area was inspected with all the tools currently available. If termites were found, termites were collected and sent to the USDA with a final report of the inspection.

New Orleans Mosquito and Termite Control Board participated in the Operation Full Stop technical meeting in March 17 and 18, 2004. Data regarding of Decatur Street railroad project was presented. A project was initiated in January 2002 with NOMTCB and Dow AgroSciences LLC to access and then reduce the termite pressure along the railroad tracks and the adjacent levee planters along the French Quarter between the Mississippi river and the flood walls. This was an area that never received any kind of termite treatment and the evidence of Formosan subterranean termites (FST) and damage was evident. Because of the high termite pressure, high precipitation, and lack of treatment in this area, the creosote treated railroad ties were highly damaged. Four hundred and eighty Sentricon®Stations (®Registered trademark of Dow AgroSciences LLC, Indianapolis, IN) were installed along the mile of track and on the levee around the wooden planters. Foraging territories of detectable colonies were determined using a mark-recapture technique. Colony identity, social structure, and colony relatedness is currently being determined by microsatellite genotyping. Termite bait using 0.5% noviflumuron began at the railroad

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lated bait matrix. These projects are being conducted on city property in addition to the Jean Laffitte National park allowing for buildings to be treated successfully without a fee for the treatment.

A postdoctoral research position has been advertized at New Orleans Mosquito and Termite Control Board. The objective is to evaluate, develop, and validate best practices for management, control, and detection of termites with emphasis on Formosan subterranean termites (FST). The prospective candidate is expected to work with program managers and other scientists to develop and employ area-wide strategies for the suppression of and control of FST. Prospective candidates are submitting their *curriculum vitae* for review. No candidate has been selected at this time.

Extension and Technology Transfer

We offer information to the public about termites and termite control. We received many calls from the community to obtain information about termites and other insects. The majority of the calls were received in April and May which is the swarming season of Formosan subterranean termites, however, the calls remain steady throughout the year.

NOMTCB had a booth at the Major's Women's Conference. This was a great opportunity to inform people about termites and mosquitoes. The booth was visited by the Mayor and it was well received by the participants.

The Pest Management seminar series has been successful and has had excellent participation from NOMTCB, the USDA-ARS, the pest control community, and other interested parties. The speakers were well respected professionals from the Louisiana State University and from the greater New Orleans pest control industry. The topics included subjects related to the pest control industry.

Several presentations were made in 2004 at the Louisiana pest control technician recertification meetings in Harahan and Metairie. Topics included: termite biology and control, area-wide management of termites, ants, and West Nile virus. In addition, additional training on various topics was provided to individual pest control companies upon request. I participated in a Research and Demonstration general standards recertification in Alexandria, Louisiana. A seminar was presented at the University of Florida Entomology and Nematology Department, two hour presentations were made a at the Home Builders Association of Houma annual meeting regarding termite biology, control, and prevention. Presentations were also made a the Nebraska State Pest Control Annual Conference and at the Missouri Pest Control Association Annual meeting. A trip to Atlanta was sponsored by Arrow Pest Control to discuss and demonstrate different termite detection tools available. The infrared camera, PestFinder, and laparoscope were used in a termite infested house. Data about the Riverfront Railroad was presented at the National Urban Conference in Phoenix, Arizona. Data regarding efficacy of 0.5% noviflumuron in Louisiana was presented in October at the Annual Meeting of the Entomological Society of America in Salt lake City. I also was a co-author on three other presentations at that meeting.

A trip to Washington D.C. was made with the American Mosquito Association to meet with Senators and Congressmen to discuss issues related to Mosquito Control in Orleans Parish. I attended the American Mosquito Association annual meeting and was able to meet researchers and members of mosquito abatement districts and I attended the Association of Structural Pest Control Regulatory Officials annual meeting. A presentation describing the current status of the infestation of Formosan subterranean termites was made at the Louisiana Mosquito Association Annual meeting in October.

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Additional Activities

Dispersal flight activity was monitored in the Riverfront and French market areas of the French Quarter.Forty-two sticky traps were hung on streetlights in the French market and Riverfront from Barracks St. to Canal St. and from Decatur St. to the Mississippi River. These traps were monitored bi-weekly during the FST swarming season. The data was collected and reported to the USDA-ARS Operation Full Stop Program. The riverfront sticky traps saw an overall reduction in the number of alates recovered in 2004 (12,593) than 2003 (18,747).

In 2004, I have continued to be actively involved in infrared termite inspections for properties involved in the USDA-ARS Operation Full Stop French Quarter Study.

From June 28 to July 2, Claudia Riegel and I attended a class entitled "Ant Biology and Control" offered by the University of Florida in Ft. Lauderdale. Subsequently, I conducted a survey of the ants in Armstrong Park. Ant surveys allow for an understanding of the common ant fauna in a given area. This assists pest management professionals in the correct identification of pest ants in their region. Ant surveys also assist by providing a snapshot of pest ants in time. In the future I intend to repeat this survey, which may provide important information on the status of exotic species over time.

In the survey seventy-four collection sites were selected. Close observation in each site yielded a total of 146 individual collections. Twelve ant species were collected, represented by 11 genera from 5 subfamilies (Table 1). Four common pestiferous ant species represented 80% of the total ant collections. These were: a rover ant species (*Brachymyrmex sp.*), the red imported fire ant (*Solenopsis invicta*), The Argentine ant (*Linepithema humile*), and the crazy ant (*Paratrechina longicornis*). Eight additional species were not as commonly collected.

Table 1. Ant Subfamilies, Genera and Species Collected in Louis Armstrong Park.

Subfamily	Genus	Species	Number of Collections	Percentage of Total Collection	Percentage Found in Each Microhabitat* 1	2	3	4
Formicinae	Brachymyrmex	sp.	50	34.2	4	48	42	6
Myrmicinae	Solenopsis	invicta	42	28.8	2	45	36	17
Dolichoderinae	Linepithema	humile	15	10.3	13	27	60	0
Formicinae	Paratrechina	longicornis	12	8.2	0	50	33	17
Myrmicinae	Pheidole	sp.1	8	5.5	0	75	25	0
Myrmicinae	Crematogaster	ashmeadi	7	4.8	0	71	29	0
Pseudomyrmicinae	Pseudomyrmex	gracilis	5	3.4	0	80	20	0
Myrmicinae	Cyphomyrmex	sp.	2	1.4	0	100	0	0
Ponerinae	Hypoponera	sp.	2	1.4	0	50	50	0
Myrmicinae	Pheidole	sp.2	1	0.7	0	100	0	0
Myrmicinae	Tetramorium	sp.	1	0.7	0	100	0	0
Dolichoderinae	Dorymyrmex	sp.	1	0.7	0	100	0	0

*Microhabitat 1: wide-open, shaded areas with lush vegetation due to irrigation and landscaping. 2: wide-open, shaded grassy areas without irrigation. 3: Small grassy areas without irrigation surrounded by pavement (planters and medians), often not well shaded. 4: Parking lots with very little to no shade, far from vegetation.

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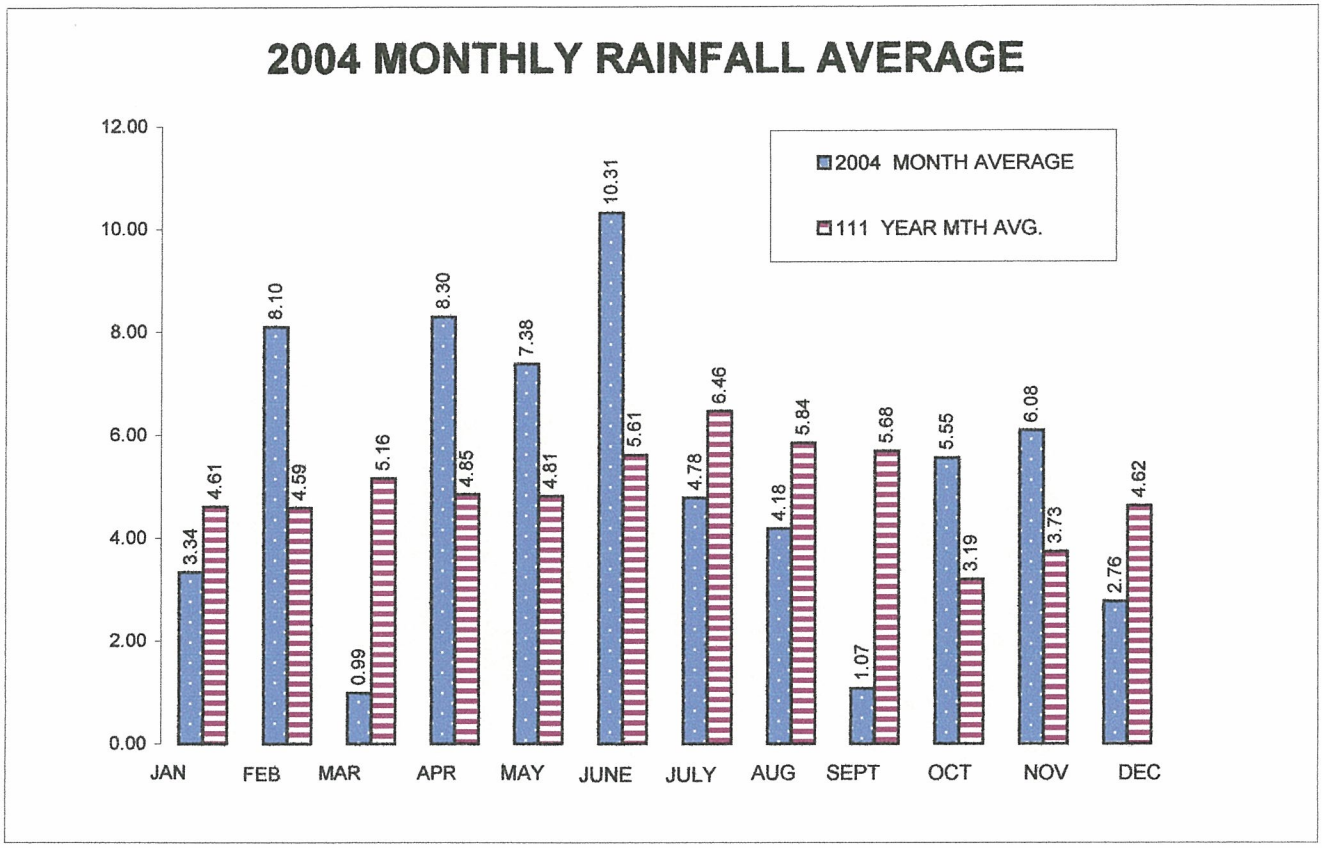
2004 MONTHLY RAINFALL AVERAGE
2004 MONTH AVERAGE
111 YEAR MTH AVG.
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10.00
8.00
6.00
4.00
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3.34
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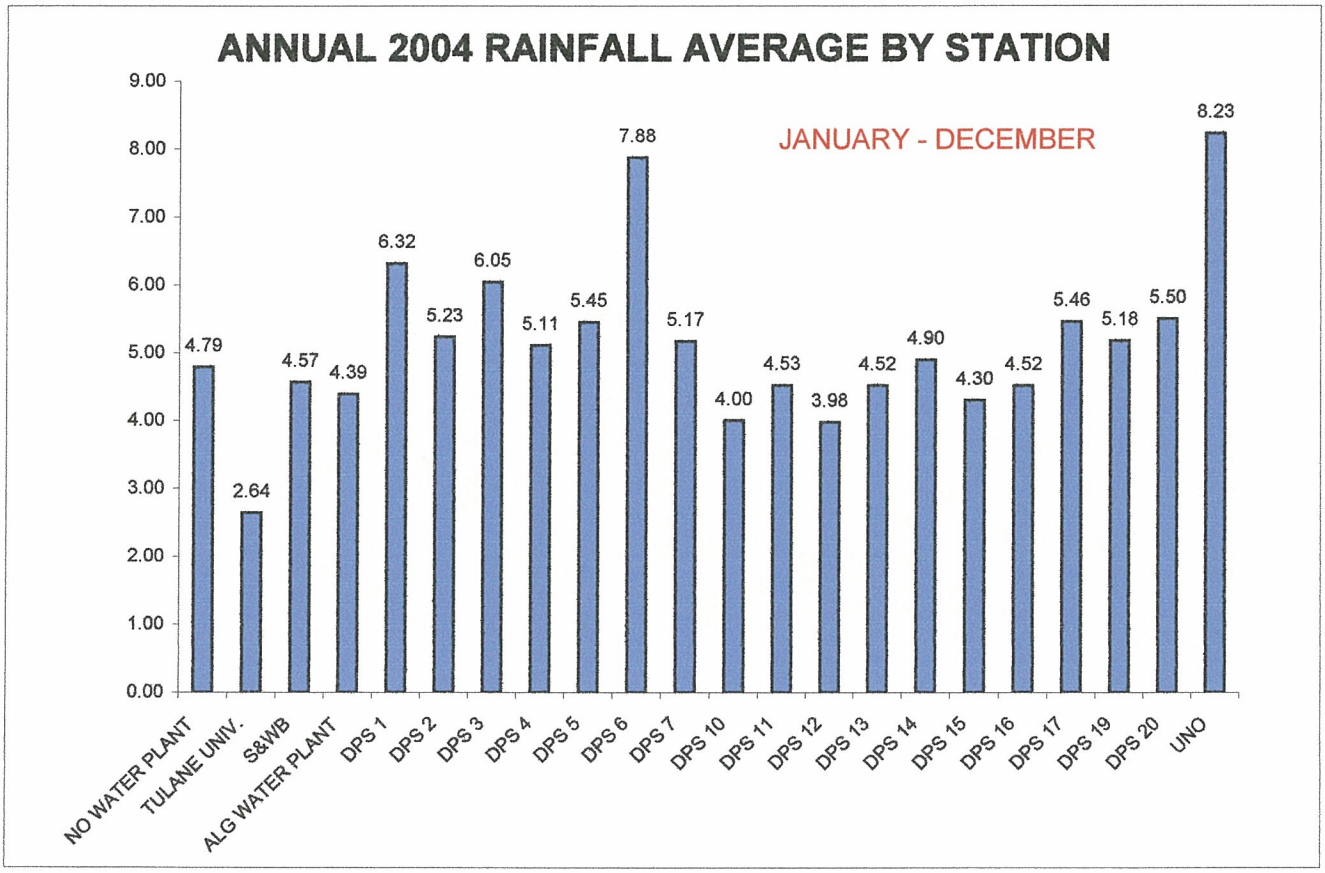
ANNUAL 2004 RAINFALL AVERAGE BY STATION
JANUARY - DECEMBER
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8.23
NO WATER PLANT
TULANE UNIV.
S&WB
ALG WATER PLANT
DPS 1
DPS 2
DPS 3
DPS 4
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DPS 6
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UNO

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
NO WATER PLANT	3.24	8.11	1.06	6.67	2.25	10.54	6.07	4.39	1.05	6.61	4.53	2.96	57.48
TULANE UNIV.	0.69	5.15	0.67	4.06									10.57
S&WB	4.02	7.38	1.73	8.55	12,07	8.86	3.69	4.34	1.43	5.83	5.66	3.29	54.78
ALG WATER PLANT	2.84	6.80	1.64	5.10	10.37	9.05	5.09	4.29	1.25	0.75	2.42	3.13	52.73
DPS 1	3.71	6.56	0.98	6.59	15.08	9.85	8.87	1.59	0.93	11.41	8.21	2.04	75.82
DPS 2	3.31	7.62	0.66	6.76	9.27	9.97	6.38	4.01	0.73	6.25	5.08	2.75	62.79
DPS 3	3.11	8.43	1.05	10.70	9.84	11.37	6.94	4.28	0.82	5.05	8.26	2.72	72.57
DPS 4	2.44	8.47	0.57	7.69	8.71	10.14	6.95	1.99	0.31	4.91	6.89	2.25	61.32
DPS 5	3.85	8.03	1.51	10.66	6.28	10.91	3.80	5.03	1.12	5.38	5.81	3.07	65.45
DPS 6	3.47	15.41	0.84	13.81	14.04	18.20	5.68	7.18	1.24	5.85	5.85	2.97	94.54
DPS 7	3.10	9.07	0.58	6.43	8.38	10.79	4.46	4.66	0.04	5.75	6.20	2.60	62.06
DPS 10	3.24	6.95	0.68	7.63	3.70	10.14	1.43	4.99	1.84	0.29	5.65	1.48	48.02
DPS 11	3.89	6.35	2.00	6.28	4.44	9.21	1.85	2.09	0.72	7.99	5.51	3.97	54.30
DPS 12	2.59	7.64	0.48	10.11	5.33	9.86	2.62	2.43	n/a	n/a	4.26	2.45	47.77
DPS 13	3.86	6.06	2.13	7.05	4.77	9.22	2.08	1.83	1.20	7.23	5.39	3.42	54.24
DPS 14	3.47	7.74	0.53	8.69	4.87	9.80	1.48	5.00	2.25	4.87	7.57	2.54	58.81
DPS 15	3.69	7.17	0.47	7.39	4.19	6.19	3.30	4.67	1.46	3.73	6.76	2.61	51.63
DPS 16	3.27	8.89	0.22	9.29	3.77	6.88	3.45	4.35	0.98	5.75	4.59	2.76	54.20
DPS 17	3.78	8.82	1.59	8.62	6.97	8.24	7.49	5.26	1.15	5.14	5.90	2.58	65.54
DPS 19	3.82	4.76	1.29	9.81	7.24	10.74	4.44	5.11	1.07	4.43	5.91	3.57	62.19
DPS 20	3.71	8.68	1.06	8.66	4.55	11.84		6.07	0.82	6.08	6.30	2.78	60.55
UNO	4.60	14.42		11.92	8.77	14.43	9.51	4.19	1.59	7.91	11.12	2.11	90.57
2004 MONTH AVERAGE	3.34	8.10	0.99	8.30	7.38	10.31	4.78	4.18	1.07	5.55	6.08	2.76	62.84
111 YEAR MTH AVG.	4.61	4.59	5.16	4.85	4.81	5.61	6.46	5.84	5.68	3.19	3.73	4.62	59.15
DAYS OF RAIN-2004	7	12	6	9	13	28	18	17	6	11	10	8	145
2003 MONTH AVERAGE	0.12	6.08	4.65	5.39	2.32	17.79	9.17	3.53	2.50	3.24	5.31	2.11	62.21
2002 MONTH AVERAGE	3.97	2.23	4.77	3.50	2.27	5.49	5.83	5.63	22.42	9.78	3.99	4.98	74.86
2001 MONTH AVERAGE	3.02	1.04	11.44	0.53	2.02	19.08	7.47	7.04	5.62	4.35	3.29	3.02	67.92

2004 RAINFALL BY STATIONS