

**CHESAPEAKE MOSQUITO CONTROL COMMISSION**

**2004  
ANNUAL REPORT**

**Gene R. Payne, Director**

Annual Report information compiled and edited by  
Kirby R. Foley, Sr. and Katherine S. Rogers  
Revised by Gene R. Payne

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## **COMMISSIONERS AND STAFF**

### **COMMISSIONERS**

**Dr. Nancy Welch (Chairperson )**

**Joe E. Davis**

**Ceasar di Monda**

**William Hoddinott**

**Robert L. Mann**

**Douglas McClain**

**Janie Tompkins**

**\* Donald Craun**

**\* Linda Garland**

**\* Haywood Rogerson**

**\*Commissioners that served through July ...Number of commissioners reduced from 10 to 7**

### **CENTRAL OFFICE STAFF**

**Gene R. Payne, Director**

**Louis DeMarco, Operations Director**

**Jo Ann Beasley, Administrative Assistant**

**Susan Freeman, Office Specialist**

**Deborah Vines, Office Specialist**

**Roger Burnham, Custodian**

### **GEOGRAPHIC INFORMATION SYSTEMS**

**Melissa Cushing, G.I.S. Analyst**

### **BIOLOGY DEPARTMENT**

**Kirby R. Foley, Biologist II**

**Jason W. Williams, Biologist I**

**Connie Gregg, Biologist Technician**

**Katie Rogers, Biologist Technician / PT**

**Steve Bynum, Biologist / PT**

**Joe Simmons, Biologist / PT**

**Aaron Lambert, Intern**

**Genny Wickizer, Intern**

## **DISTRICT OFFICES**

### **Deep Creek District**

**Roland Soderholm, District Supervisor  
Derrick Adams, Field Supervisor II  
Charles Darden, Field Technician II  
James Hayes, Field Technician II  
Allen Peoples, Field Supervisor II  
Alice Ramsey, Field Technician II  
Patricia Scott, Field Technician I  
John Trotter, Mechanic Technician  
Ronald Wells, Applicator II**

**Joseph Cato, Field Technician II  
Ulrik Harvest, ULV Driver/PT  
William Murray, Field Technician II  
Michale Powell, Mechanic Technician  
Zollie Russell, Applicator II  
Jerry Spence, Applicator II  
William Trotter, Field Technician II  
Martell White, Field Technician II**

### **Greenbrier District**

**James Lemnios, District Supervisor  
Jack Akers, Field Technician II  
Robert Bailey, Applicator II  
Winfred Cooper, Field Supervisor II  
Ronald Harris, Applicator I  
Robert Jarrell, Applicator I  
Steve Lemnios, Field Supervisor II  
Randolph Scott, Applicator I**

**Shamsiddeend Ali, Field Technician I  
Chris Carraway, Applicator I  
Gary Harmon, Field Technician II  
Nick Hendricks, Applicator I  
Mark Leary, Applicator III  
Shawn Mehall, Field Technician II**

### **Southern Chesapeake District**

**Leroy Bohn, District Supervisor  
Darin Brown, Applicator I  
Jerry George, Applicator III  
Ronald Johnson, Applicator III  
George Lamb, Field Technician II  
Steve McPherson, Field Supervisor II  
Reginald Saunders, Field Technician II  
Scott Stevens, Applicator III  
Terrance Turner, Field Technician II**

**Dana Coupland, ULV Driver/PT  
Kris Hendricks, Field Technician II  
Richard Jones, Applicator III  
James Lawrence, Applicator II  
Joe Parrish, Applicator I  
Tameka Smith, Field Technician I  
Craig Strickland, Applicator I  
Robert Whitaker, Field Supervisor II**

### **Mechanics**

**John Tyndell, Mechanic II  
Jack Akers, Mechanic I**

## **INTRODUCTION**

The purpose of the Chesapeake Mosquito Control Commission is to conduct mosquito control activities in the city, as directed by the Director who is appointed by the Board of Commissioners.

The ten (10) member Chesapeake Mosquito Control Commission was reduced to seven (7) members during July. Six of the members are volunteer residents appointed by the Chesapeake City Council; the seventh is a designee of the Virginia Health Director and serves as Commission Chair.

The goal of the Chesapeake Mosquito Control Commission is to reduce and control the mosquito population using the safest and most effective means available.

The Commission is made up of three service districts: Deep Creek, Greenbrier, and Southern Chesapeake.

## **MOSQUITO BIOLOGY**

Mosquitoes are known for their significance to man as pests and especially as vectors of human and animal diseases.

A mosquito undergoes a complete metamorphosis by passing through four successive stages in its development: egg, larva, pupa and adult. Complete development can take as little as five days but normally takes ten to fourteen days depending on the species and environmental conditions. With the exception of the adult, all stages require water to complete development.

After breeding, the adult female requires a blood meal for the development of viable eggs. Males feed on plant nectar and do not take blood meals.

The adult female of *Anopheles*, and some *Culex* pass the winter in hibernation in protected places, whereas others over-winter in the egg or larval stage.

The flight habits of mosquitoes vary greatly with the different species. Some stay near their aquatic habitats, while others may wander a half, one, five, or up to forty miles.

## **IMPORTANCE OF MOSQUITO CONTROL**

There are two major reasons why mosquito management is important (1) mosquitoes can transmit diseases to man and animals, and (2) mosquitoes are an annoyance.

Malaria, encephalitis, yellow fever, dengue, and heartworm are diseases transmitted by mosquitoes and are having devastating effects throughout the world. Malaria causes more than two million deaths each year, and encephalitis is a very significant disease of humans in the United States. West Nile Virus, Eastern Equine Encephalitis and St. Louis Encephalitis are serious concerns in the U.S. today.

Mosquito-borne diseases also affect both wild and domestic animals. Unvaccinated horses and emus are highly susceptible to Eastern Equine Encephalitis: death rates may reach 90% once encephalitis is contracted. Horses, a few small mammals, and some birds are very susceptible to West Nile Virus. Dog Heartworm, another mosquito-borne disease kills many domestic dogs each year. Dog Heartworm is both preventable and treatable.

The presence of mosquitoes can cause reductions in labor efficiency, depreciation of real estate values, and interfere with outdoor recreation and activities.

The Chesapeake Mosquito Control Commission practices integrated pest management principals by employing the following techniques: source reduction, surveillance, biological controls, larviciding, public education, and adulticiding.

### **SOURCE REDUCTION**

Effective mosquito control must include efforts to eliminate or reduce sources of mosquito breeding.

Mosquitoes reproduce in standing water; therefore maintenance of drainage ditches is one of the commission's primary concerns.

The following source reduction activities were completed in 2004:

Bush (weed-eater)	94 acres	7,415 hours
Cleaning	105 miles	11,977.5 hours
Grading	30,177 cu. Ft.	425.25 hours
Refuge removed	105 tons	1,817.25 hours
Chipper	3.7 tons	87 hours
Miscellaneous		<u>5,436 hrs.</u>
<b>Total</b>		<b>27,158 total hours</b>

### **SURVEILLANCE**

Although surveillance is a primary concern of the Biology Department, it is conducted by a combined effort of the larviciding crews, field supervisors and the biology personnel.

During the breeding season, surveillance programs are conducted so control activities can be concentrated in those areas with the most serious problems and to watch for any virus activity present in the mosquito population and the sentinel chickens.

The surveillance techniques used are larval dipping surveys, trapping with CO<sub>2</sub> baited CDC traps, gravid traps, sentinel chickens, testing of mosquitoes, and service requests from the public.

### **2004 SERVICE REQUEST:**

Mosquitoes	1,377
Ditches	254
Standing Water	245
Property Release	94
Special Fogging	311
Other	71
<b>TOTAL:</b>	<b>2,352</b>

In 2004 we had 1,034 less service calls than we had in 2003.

**CDC, GRAVID, AND ROTARY TRAPS 2004:**

The Biology Department uses CDC, Gravid and Rotary Traps to survey the adult mosquito population in Chesapeake.

The carbon dioxide (CO<sub>2</sub>) baited CDC light trap is the primary method used to capture adult mosquitoes. They are set for over-night collections of mosquitoes, which are then separated and speciated into pools for arboviral testing. We set at least forty-one of these traps each week throughout Chesapeake. CDC light traps utilize a battery powered light source to attract mosquitoes and are baited with CO<sub>2</sub>, as an additional attractant. CMCC uses pressurized tanks, which emit regulated low levels of CO<sub>2</sub>.

The Gravid Trap is used to attract and capture gravid adult mosquitoes. The attractant used is an infusion of hay, grass clippings, yeast, and water that has been allowed to ferment. The primary target species are *Culex* and *Aedes albopictus*. We set five or six Gravid Traps each week in areas that have the older sewage systems and have high numbers of the above species.

The Rotary Trap is a new tool that we use to survey the adult mosquitoes and their periods of activity. It allows us to trap eight 2 hour periods for a total of sixteen hours each night. We separate and speciate each two hour period to determine which species were active and what hours that they were active. This information could be used to indicate the most effective hours to adulticide. The Rotary Trap also uses a light source and CO<sub>2</sub> as attractants for the mosquitoes. We set the Rotary Trap four nights each week.

The presence of CO<sub>2</sub> widens the array of mosquitoes that are attracted and allows these traps to be effectively set to collect mosquitoes that are active during both daylight and evening hours.

The mosquitoes are collected alive in the CDC and Gravid traps by containing them in a net instead of a killing jar. Collecting the mosquitoes alive is necessary for viral detection.

Our biology personnel set 1,135 traps at eighty different locations within the city. A total of 289,455 mosquitoes were captured at these sites and the species known to be capable of transmitting Eastern Equine Encephalitis (EEE) and West Nile Virus (WNV) were tested at the Norfolk Health Department Lab.

CMCC is a member of the Tidewater Regional Arboviral Surveillance Team (TRAST), a cooperative effort of the regional mosquito control agencies and the Norfolk Health Department laboratory for the arboviral testing program.

**WEATHER CONDITIONS DURING 2004 MOSQUITO SEASON**

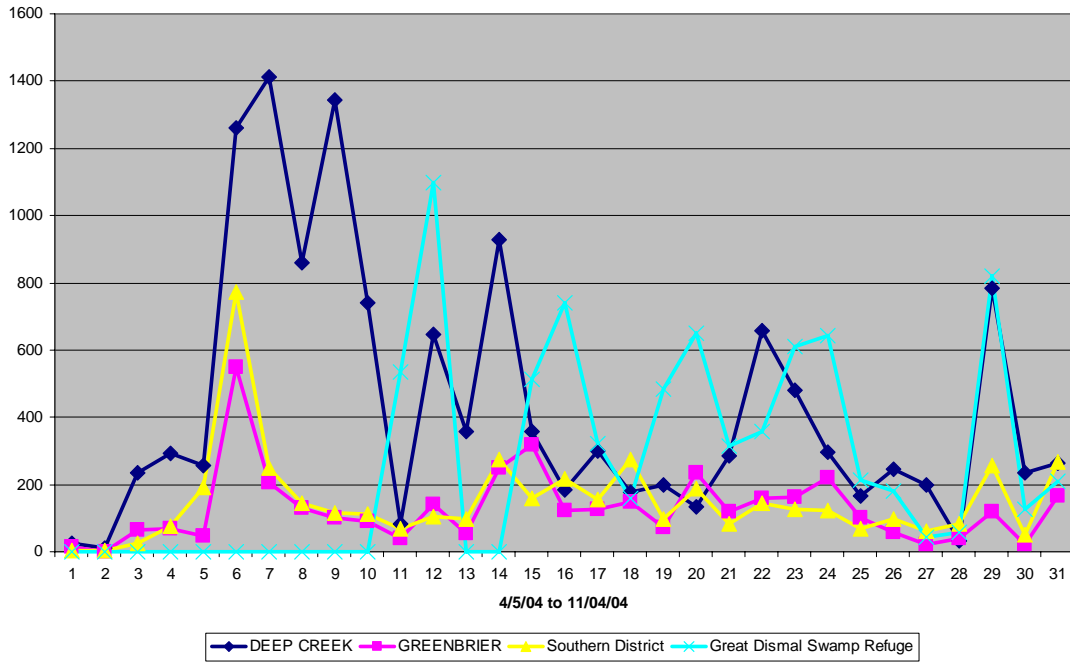
MONTH	Normal Rainfall	2004 Rainfall	+ OR - Difference	Normal Average Temp.	2004 Season Temp.	+ OR - Difference
April	3.38	2.82	- 0.56	57.4°	60.3°	2.9°
May	3.74	4.67	0.93	66.3°	73.1°	6.8°
June	3.77	4.86	1.09	74.5°	75.1°	0.6°
July	5.17	10.89	5.72	79.1°	79.2°	0.1°
August	4.79	11.11	6.32	77.4°	76.0°	- 1.4°
September	4.06	3.3	- 0.76	72.1°	72.6°	0.5
October	3.47	1.88	- 1.59	61.1°	60.9°	- 0.2
Totals:	28.38	39.53	11.15	69.7°	71.03°	1.33°

## MOSQUITOES TRAPPED IN CHESAPEAKE BY DISTRICT 2004

	DEEP CREEK	GREAT DISMAL	GREENBRIER	SOUTHERN	CHESAPEAKE	
		SWAMP		CHESAPEAKE	CITY-WIDE	Percent
<b>WEEK DATES:</b>	3/1-11/14/04	6/14-11/14/04	3/1-11/14/04	3/1-11/14/04	Total	
<b># of Traps:</b>	396	90	342	310	1138	
<b>% of Traps</b>	34.8%	7.9%	30.1%	27.2%		
<b>SPECIES:</b>						
Male	2890	675	1656	2714	7935	2.7%
<i>Ae albopictus</i>	252	3	4954	27	5236	1.8%
<i>Ae vexans</i>	603	129	608	455	1795	0.6%
<i>Oc atlanticus</i>	4022	822	824	463	6131	2.1%
<i>Oc canadensis</i>	18215	707	1107	10085	30114	10.4%
<i>Oc grossbecki</i>	1	0	0	1	2	0.0%
<i>Oc cantator</i>	2	0	0	0	2	0.0%
<i>Oc sollicitans</i>	2	0	0	4	6	0.0%
<i>Oc taeniorhynchus</i>	2	1	6	0	9	0.0%
<i>Oc triseriatus</i>	134	31	121	81	367	0.1%
<i>Oc. hendersoni</i>	1	0	1	3	5	0.0%
<i>Oc infirmatus</i>	164	16	283	71	534	0.2%
<i>Oc sticticus</i>	0	0	2	0	2	0.0%
<i>An crucian</i>	4042	274	3395	8232	15943	5.5%
<i>An punctipennis</i>	83	0	65	575	723	0.2%
<i>An quadrimaculatus</i>	290	10	218	1398	1916	0.7%
<i>Cx pipiens</i>	28	0	609	16	653	0.2%
<i>Cx restuans</i>	521	30	797	210	1558	0.5%
<i>Cx salinarius</i>	2850	186	17814	2218	23068	8.0%
<i>Cx erraticus</i>	340	280	225	280	1125	0.4%
<i>Cx territans</i>	466	4	17	53	540	0.2%
<i>Cs melanura</i>	116644	34689	4572	16153	172058	59.4%
<i>Cs inornata</i>	0	0	0	0	0	0.0%
<i>Ps ciliate</i>	48	5	4	41	98	0.0%
<i>Ps columbiae</i>	2431	66	179	1907	4583	1.6%
<i>Ps ferox</i>	1146	93	219	470	1928	0.7%
<i>Ps howardii</i>	6	0	3	11	20	0.0%
<i>Cq perturbans</i>	3923	95	284	1744	6046	2.1%
<i>Ur sapphirina</i>	782	202	727	2122	3833	1.3%
<i>Or signifera</i>	14	5	4	12	35	0.0%
Mutilated:	1794	253	478	665	3190	1.1%
Total Females	157012	37648	37038	46632	278330	96.2%
Total Mosquitoes	161696	38576	39172	50011	289455	100.0%
% of Total Mosquitoes	55.9%	13.3%	13.5%	17.3%		

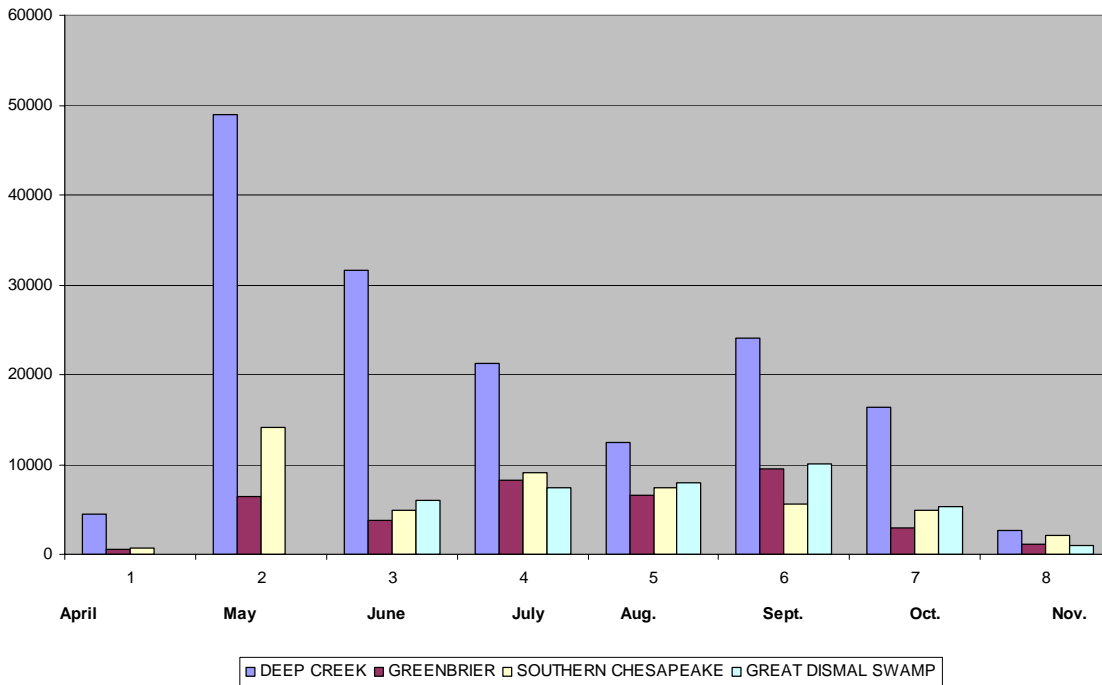
- The rainfall from 4/01/2004 through 10/31/2004 was 39.5 inches. ( 11.15 more than normal )
- The average temperature was 1.33 degrees above normal through the season.

**Average Number of Mosquitoes Per Trap by District by Each Week - 2004**



- \* We did not trap in the Dismal Swamp Refuge during April and May.
- \* Although we set two traps in the GDSR during June, we did not really start until July.
- \* We set five traps per week in the GDSR during July through 1<sup>st</sup> week of November.

**MOSQUITOES TRAPPED EACH MONTH IN EACH DISTRICT 2004**



## SENTINEL CHICKENS

The purpose of the Sentinel Chicken Program is hopefully to get an early warning of an active presence of the EEE and/or WNV viruses.

Ten flocks of five chickens each were strategically placed throughout the city. The Biology personnel drew blood samples from each chicken every two weeks. This serum was forwarded to the Norfolk Health Department Lab and tested for EEE and WNV. There were nine conversions for WNV and ten conversions for EEE in 2004. Although we only had about half the number of positives this season compared to 2003, the chickens were very effective sentinels. This was especially true for WNV, there were nine positive chickens compared to only six positive mosquito pools.

## PUBLIC EDUCATION

Extensive efforts are made to inform and educate the public about the methods of mosquito control and of potential diseases related to mosquitoes. Resident education is very important in controlling mosquito populations. A well-informed and alert resident can be as effective as a weekly property inspection by Mosquito Control personnel.

Public Service Announcements and ads are placed on radio and in news papers. Some informative interviews with Commission personnel are conducted by News Departments of local television stations.

Upon invitation, presentations are made to schools, clubs, or civic groups and are routinely made at the state and regional conferences. We strongly seek opportunities to conduct the "Jo-Jo Mosquito" presentations and Poster Contest in elementary schools. The Commission is listed on the City's public speakers list. Commission personnel are also very active in local, state, and regional training activities.

## LARVICIDING

Larviciding is the act of controlling mosquito larvae and pupae in the water by the application of *bti*, fish, or some chemical that will kill them. Larviciding is one of the most important activities of the Commission personnel during the breeding season.

Inspections performed throughout the city identify those areas where breeding occurs and when found an appropriate larvicide technique is employed according to the area and/or stage of breeding found.

The Commission contracted with private companies to conduct aerial larviciding in selected areas of the City. The primary purpose was to try to prevent the first broods of *Aedes vexans* and *Ochlerotatus canadensis* from coming off and therefore reducing their future broods and numbers. The other main target species was *Culiseta melanura* in an effort to reduce the opportunities for EEE. The areas selected for the aerial application of *bti* were hard to reach and rain soaked or flooded wooded areas. The fixed-wing plane larvicided 8,152 acres and the helicopter covered 6,607 for a total of 14,759 acres. The immediate before and after larval surveillance indicated that we had 85 to 95% less larvae in the treated areas. The adult trapping surveillance throughout the season indicated that the aerial application was significantly effective on two of the target species. We trapped 88% less *Ae. vexans* and 60% less *Oc. canadensis* compared to 2003's numbers. The

*Culiseta melanura* result was different, we actually trapped 23% more than last season. Although the *Cs. melanura* numbers increased, we think the aerial larviciding reduced their numbers slightly where Hurricane Isabel left some of their breeding sites exposed. The above *Ae. vexans* and *Oc. canadensis* numbers are significant because we only trapped eighteen percent less total mosquitoes this season than we did in 2003.

We larvicided 3,347 acres by hand, ATVs, and Roadside Jeeps. That is 37% less than the crews did last year. How much of the above 37% was due to the aerial application? There were 21,417 man hours used in our larviciding efforts.

**TOTAL COMBINED LARVICIDING FOR CHESAPEAKE .....18,106 ACRES**  
**TOTAL MAN HOURS .....22,417**

### **ADULTICIDING**

During the mosquito-breeding season, it is virtually impossible to find and treat all places where breeding might occur. In addition, mosquitoes can migrate into controlled-areas from adjacent non-controlled areas. For these reasons, the Commission performs adulticiding on an as needed basis.

Adulticiding is the act of operating a machine to uniformly disperse small amounts of a pesticide over a given area to control adult mosquitoes. This is accomplished utilizing various forms of ULV (ultra-low-volume) spraying equipment.

The City, less the Great Dismal Swamp Refuge, is divided into thirty truck routes and fifteen ATV routes. Additional adulticiding, special fog request and individual yards are treated by ULV sprayers on an as needed basis.

We adulticided 57% less acres this year than we did in 2003. How much, if any, was due to the aerial larvicide application? There were 4,167.5 man hours used in our adulticiding efforts.

**TOTAL ADULTICIDING FOR CHESAPEAKE .....509,235 ACRES**  
**TOTAL MAN HOURS ..... 4,168**

### **BIOLOGICAL REVIEW 2004**

We started the season by conducting larval surveillance to help determine if the Commission would contract for an aerial application of larvicide. The Commission chose to do the aerial larvicide program. We conducted more larval surveillance before and after the aerial application to determine how effective it was. We found that the program averaged 85 to 95 % effective in treated areas. The less effective areas were due to sections of large adult pine canopy and the plane or helicopter flying and spraying in the opposite direction of how the trees fell during Hurricane Isabel. The above two situations prevented the larvicide droplets from reaching some of the larva containing water pools. The aerial larvicide program accomplished the primary goal of reducing the broods and numbers of the *Aedes vexans* and the *Ochlerotatus canadensis* species. We continued larval surveillance and identification throughout the season.

We averaged setting 37 CDC, 4 Rotary and 5 Gravid traps for a total of forty-six each week. The CDC and Rotary traps used both light source and CO<sub>2</sub> as attractants to lure the mosquitoes. The Gravid traps were baited with an infusion of hay, water, grass clippings and yeast that had been fermented. We expanded our trapping area to include the northeast area of the Great Dismal Swamp Refuge. We set 90 traps and captured 38,576 mosquitoes in the Refuge. Of the Refuge mosquitoes, eight pools were positive for Eastern Equine Encephalitis and one was positive for West Nile Virus. We trapped and identified 289,455 mosquitoes in the total City area. We pooled 3,876 pools and 3,441 were tested by the Norfolk Health Department Lab for EEE and WNV. We had 43 pools positive for EEE and 6 pools positive for WNV.

Suggested: something like this

Great Dismal Swamp:

- 90 traps set
- 38,576 mosquitoes trapped
- (how many pools?)
- (how many tested)
- 8 pools were positive for EEE
- 1 pool positive for WNV

City wide: (do these #s include swamp)

- (how many traps)
- 289,455 mosquitoes trapped
- 3,876 pools
- 3,441 tested
- 43 pools positive for EEE
- 6 pools positive for WNV

Twenty-five blood samples were drawn each week from the sentinel chickens and delivered to the NHD Lab for testing. Of the 514 serum samples, ten were positive for EEE and nine were positive for WNV.

The Virginia Health Department reported one EEE positive horse and one WNV positive horse in Chesapeake. Both horses were euthanized.

Virginia felt seven storms in 2004. Two passed close by and five actually crossed over part of Virginia (a record) and these storms spawned forty-three tornados (another record). We had 11.15 more inches of rainfall and averaged 1.33 degrees warmer temperature than normal.

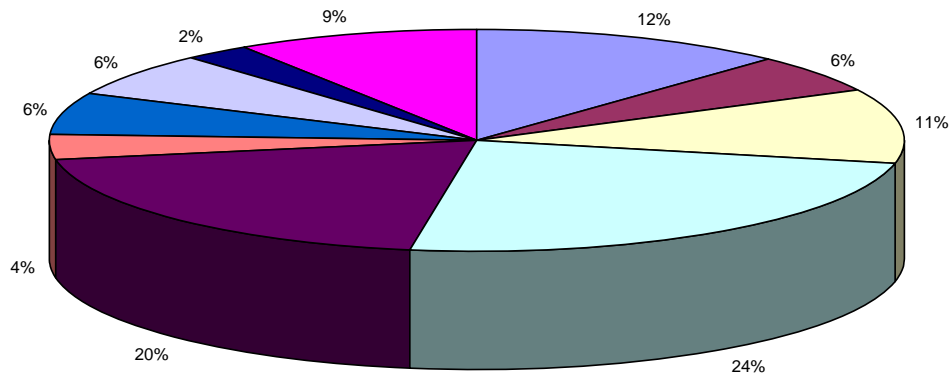
Although we had a very active year with the overall above normal mosquito populations, above normal rainfall and warm temperatures, and above normal incidents of disease, we had a very successful year. **We had another year without any infected humans in Chesapeake.**

#### **BIOLOGY DEPARTMENT HOURS 2004**

Collect Sentinel Chicken Blood	480
Care of Chickens	390
Set and Collect Traps	2740

Identify and Pool Mosquitoes	2254
Deliver samples to Norfolk Lab	180
Equipment maintenance and loading	344
Larval dipping	264
Larval identification	132
School, Civic Club and Peer presentations	106
Training, Professional and in-house	458
Administration	512
Supervision	558
Annual Report	144
Computer work for total Mosquito Control	210
GIS Field work	172
VMCA Office and Web-site work	170
Vacation, Sick, Jury, Funeral, Holiday, etc.	<u>1251</u>
<b>Total:</b>	<b>10,365</b>

### PERSONNEL HOURS 2004



Administration 13,520 hours	Supervision 6,240 hours	Field Supervision 12,480 hours
Drainage 27,158 hours	Larviciding 22,417 hours	Adulticiding 4,168 hours
Building and Grounds 6,880 hours	Equipment Maintenance 7,359 hours	Training and Education 2,695 hours
Biology Department 10,365 hours		