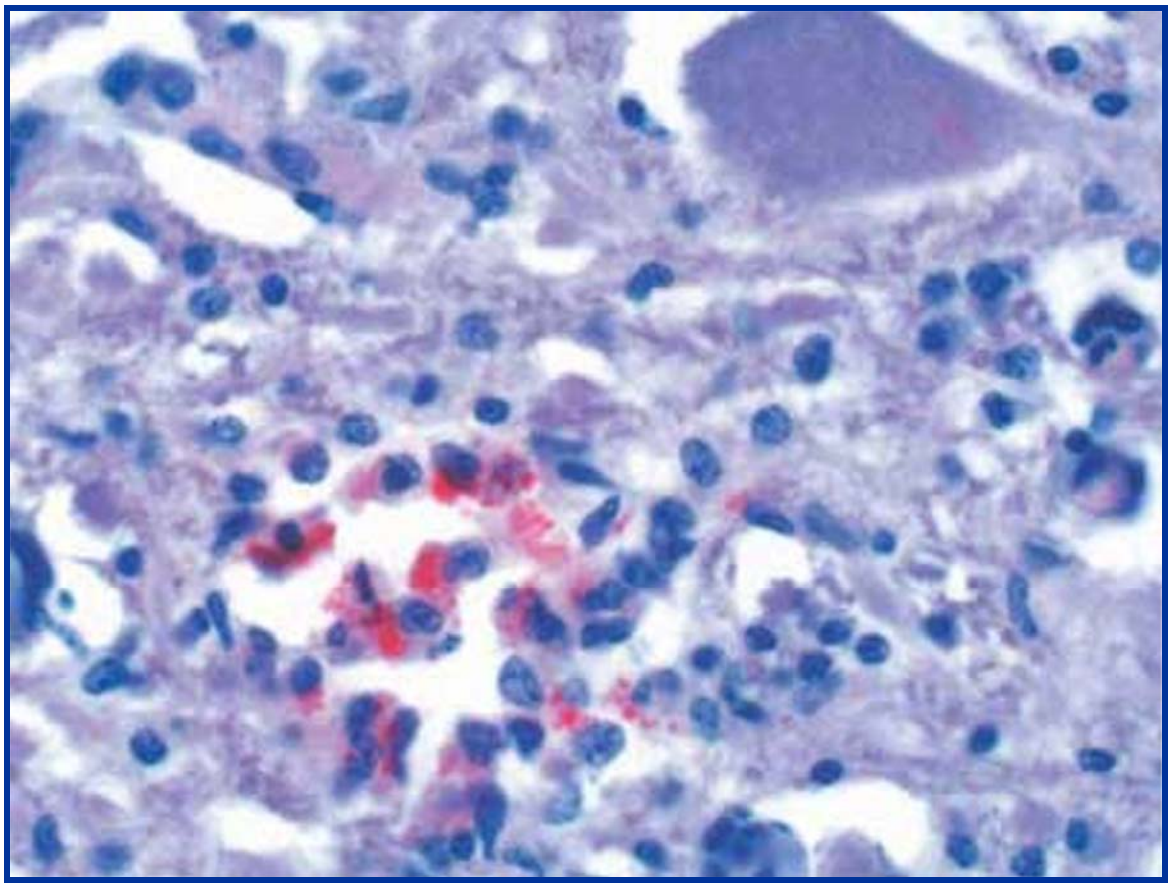
2004 Annual Report
Garfield County Cooperative Mosquito Control Program



October 22, 2004

Colorado Mosquito Control, Inc.

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ON THE COVER:

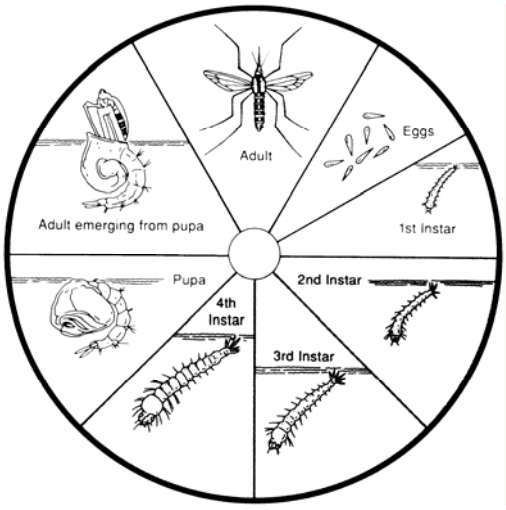
WEST NILE VIRUS IMAGE

FALSE COLOR IMAGE OF WEST NILE VIRUS PARTICLES (RED) IN HUMAN TISSUE. RESEARCHERS CONTINUE TO STUDY THE WEST NILE VIRUS. FROM UNDERSTANDING THE PROTEIN STRUCTURE OF THE VIRUS PARTICLE TO WEATHER PATTERNS, TO AVIAN ECOLOGY, WORK CONTINUES IN THE WAR AGAINST WNV DISEASE.

DURING THE SUMMER OF 2003, THE STATE OF COLORADO EXPERIENCED THE WORST EPIDEMIC OF HUMAN MOSQUITO-BORNE DISEASE ON RECORD IN THE WESTERN UNITED STATES WITH NEARLY 3,000 CASES AND 63 DEATHS.

AS OF OCTOBER 4, 2004, 271 HUMAN CASES OF WEST NILE VIRUS HAVE BEEN REPORTED IN COLORADO WITH 3 DEATHS. THE VAST MAJORITY OF CASES OCCURRED ON THE WEST SLOPE AND WERE CONCENTRATED IN GRAND JUNCTION AND MESA AND DELTA COUNTIES. SIGNIFICANT NUMBERS OF HUMAN CASES CONTINUED TO SHOW UP ACROSS COLORADO, PARTICULARLY THE NORTHERN FRONT RANGE WHICH WAS HARD HIT IN 2003.

THE MOSQUITO LIFE CYCLE



GARFIELD COUNTY COOPERATIVE MOSQUITO CONTROL PROGRAM ANNUAL REPORT 2004

TABLE OF CONTENTS

Introduction

During the spring of 2004, in response to positive West Nile Virus cases in the summer of 2003, Garfield County and seven municipal entities took steps to fight mosquitoes and the risk of West Nile Virus mosquito-borne disease. They joined together to initiate a large-scale mosquito control program designed to reduce the threat of West Nile Virus and to help protect and educate the human population of Garfield County.

Colorado Mosquito Control, Inc. (CMC), an established large-scale municipal mosquito control company was contracted by Garfield County in coordination with the eight municipalities within Garfield County to design and implement a widespread comprehensive program. Garfield County's West Nile Task Force oversaw and helped the implementation throughout the mosquito season. The total contracted area within the county was approximately 100 square miles.

Within the boundaries of each control area are an extremely diverse group of people, interests and topography. A large portion of Garfield County is established as agricultural area, sheep and cattle ranching, and fruit and vegetable growing. However within the county, gas and coal mining also are important parts of the industry. Tourism in Garfield County is a large part of the industry and does present a few problems when attempting to establish an IPM (Integrated Pest Management Program) program. The Geography of the control area is also quite diverse. Features within the control area include, flood, and sprinkler irrigated agricultural land; large riparian habitats; dry hills covered with indigenous rangeland; dry land farming areas; cities; and smaller agricultural communities.

Under the contract, CMC was responsible for designing and implementing an Integrated Pest Management (IPM) program targeting larval mosquitoes but also providing intensive adult mosquito surveillance, laboratory identification of mosquito species and adult control throughout each service area. Colorado Mosquito Control was also responsible for responding to citizen calls about mosquitoes and mosquito control activities; and worked with health department personnel to educate the public at large and individuals about WNV. CMC also worked with individuals outside the designated control areas, giving them technical assistance in controlling mosquitoes on their own property and protecting themselves from mosquito vectored diseases.

2004 Garfield County Cooperative Mosquito Control Program

Cooperating Municipalities

Garfield County

Carbondale

Glenwood Springs

New Castle

Silt

Rifle

Battlement Mesa

Parachute

2004 Season Perspective

Establishing a large scale Integrated Pest Management (IPM) mosquito control program is a complex and time consuming undertaking. The size, geographic diversity, and variety of human perspectives within the Garfield County control area created challenges in successfully establishing the program. In our IPM mosquito control programs, CMC attacks the mosquito at as many life stages as possible, emphasizing the preclusion of biting adult mosquitoes, by killing them in the larval stage prior to their emergence. This requires large investments of time and effort in surveying, locating, mapping, and obtaining permission to work in larval development sites (most of which are on private property). It also requires a large investment in personnel, equipment, and training for field technicians who are the backbone of any mosquito control program. Adult mosquito surveillance and

control are also integral and essential parts of an IPM mosquito control program particularly in light of the West Nile Virus threat. Adult surveillance allows CMC personnel to assess and improve the efficacy of the larval control efforts, as well as target adult mosquito spraying to those areas where there are high populations of adult mosquitoes.

Planning and design of the program took place through the late winter with the initial field operation steps taken in mid April because of the need to start as early as possible. They included generating some rough mapping (on Arcview/Arcmap aerial photos provided by Garfield County) of areas expected to produce mosquito larvae, and establishing an office within the control area. By the beginning of May, CMC had an office up and running in downtown Glenwood Springs, which was provided by the City of Glenwood, and had completed the initial round of larval site mapping on aerial photo maps. Sites drawn onto these maps were then digitized into ArcView GIS, where they could be overlaid on the digital aerial photos and site inspection routes could be developed and printed. CMC also spent considerable time acquiring the vehicles, field equipment, office equipment, and pesticide inventories that were required.

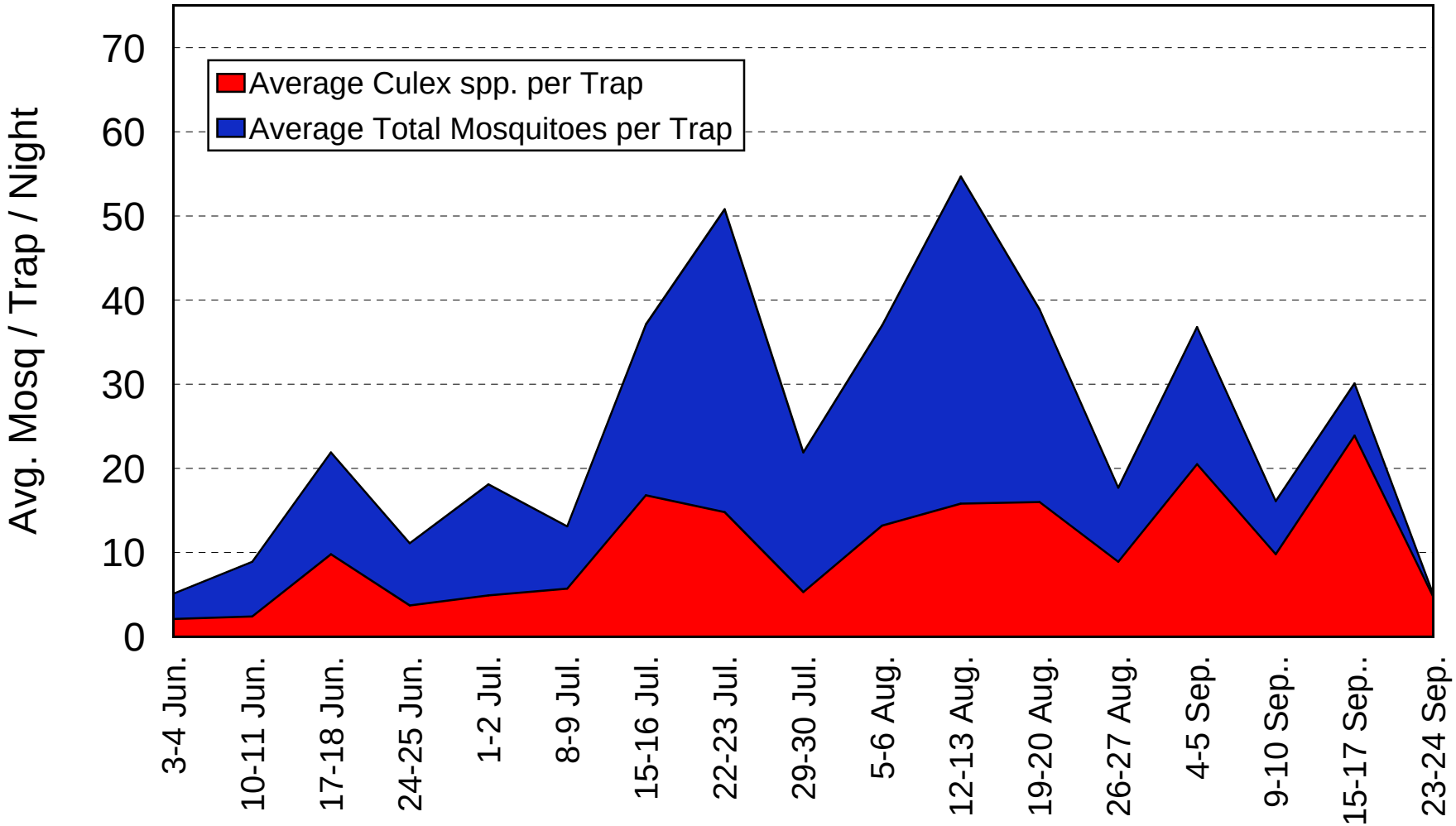
Simultaneously, CMC managers were interviewing and hiring seasonal employees needed to work on the project. The total number of seasonal technicians hired to work on the Garfield County project was approximately 5, with all employees working out of the Glenwood office. Technician training was underway from mid-April through early June, as technician start dates varied, and enough experienced personnel were available to adequately complete the field portion of the training.

CMC invests a significant amount of time, effort, and money training seasonal technicians. Training includes a full day of classroom training and a minimum of three full days of on the job field training. Training covers mosquito biology, wetlands ecology, mosquito control products, environmental toxicology, laws and regulations related to pesticides and commercial pesticide applications, company policy, landowner and public relations. CMC works to insure that all technicians are knowledgeable, confident, and comfortable doing their job prior to working on their own in the field.

CMC geared up during May, and by the end of the month most field technicians were fully trained and working independently. Some of the earliest work included mapping additional new found larval development sites and correcting map errors (a continuous and ongoing process), contacting landowners to obtain permission to work on private property, and working with other agencies to improve mapping of mosquito-breeding sites. Large scale larval mosquito control was initiated during May, and adult mosquito trapping began at the same time. Computer mapping and production of larval site inspection route books was the highest priority and was

CDC Trap Composite *Culex* vs. All Mosquitoes

2004 Garfield County Mosquito Control Program



2004 Colorado Mosquito Control, Inc.

completed as rapidly as possible. Procedures for taking telephone calls from the general public were established, and a system was initiated that would insure all calls received an appropriate response. Additional work included development of a call and shutoff database and mapping system for adult mosquito fogging operations, and establishing a list of people to contact prior to adult spraying within each control area. However, throughout the season, it never became necessary to contact those people because the fogging routes never coincided with their properties. Procedures were also established for receiving adult trap data and determining areas requiring adult mosquito ULV (ultra low volume) control applications..

By June, the Garfield County mosquito control program was fully operational. Fully trained and experienced field technicians worked hard to continue larval site mapping, site inspection, treatment, and obtaining permission from landowners to work on private property.

Each mosquito season seems to bring a unique set of circumstances created by the complex interactions of temperature, precipitation, irrigation and mosquito Biology. This summer was a perfect summer to implement an IPM program in Garfield County. Because of the lower precipitation levels on the western slope, most naturally occurring water pools remained dry or manageable. This led to a season that required the concentration of efforts on irrigation water, riparian habitats and marsh/cattail habitats.

During June, and into July normal operations continued. We increased our trapping nights, trap numbers and started to set a minimum of 15 traps a week depending on the floater trap count. Also, at this time we began sending Culex mosquito pools to be tested by the Colorado Department of Public Health. Throughout June and July widespread larviciding continued with emphasis on areas where our trap counts seemed high. These areas included the Carbondale-Glenwood (Hwy 82) corridor, Parachute, Rifle and Silt-mesa. We also continued to increase our connection with the residents of Garfield County as a newspaper article seemed to help local residents know whom to call when they had a mosquito-related problem. As July wound down the trap numbers were steadily increasing as would be expected by the time of year.

As we approached August, we saw our highest mosquito levels of the season. Also, near the end of August and into the first week of September we had our first confirmed human cases of West Nile fever and concurrently had our first positive mosquito pools in both Parachute and Rifle these positives were in the general areas of the baseball field/rodeo in Parachute and the Lyon's pond habitat in Rifle. Both of these locations were "hot spots" all summer and it came as no surprise that these were the areas where the positive mosquito pools came from. In early September, all routine larval and adult mosquito surveillance and control activities

were continued, although, at a reduced level. Through September we continued adult surveillance, "down valley" (Rifle, Parachute, New Castle, Silt) and saw a steady decrease in numbers. At the same time we slowed our larvicide operation. The end of September saw the end of the mosquito control season; and the beginning of the off-season with data analysis, report writing, clean-up, and equipment maintenance. Mosquito larviciding, trapping, and spraying, activities were concluded on September 24th. The temporary office location in Glenwood Springs was closed on October 13th, with all equipment and operations being shifted back to the main office in Broomfield. Overall the 2004 season was a success. Although human cases still occurred, the goal of the first year was to lay the groundwork for an Integrated Program. Sites were mapped, and a large amount of adult surveillance was completed. This gives Garfield County hard data to better form their cooperative mosquito program in the future.

West Nile Virus

West Nile Virus (WNV) reached epidemic proportions in Colorado during the 2003 mosquito season.* The goal of the 2004 season was to prevent that type of outbreak from occurring in Garfield County. In 2004, statewide, 272 total confirmed cases of West Nile Virus were reported to the Colorado Department of Public Health. 233 of those cases were listed as the more mild fever, 22 as meningitis, 17 as encephalitis and 3 deaths. Overall this season had much lower numbers than the previous season, which was most likely a factor of the easier "Mosquito Climate". In Garfield County, we had 5 total confirmed cases of West Nile Virus, all being the more mild fever.

2004 Human West Nile Virus Infections: Western Slope Counties

**** as of October 7, 2004***

	Clinical diagnosis			Total cases	Total deaths
	Fever	Meningitis	Encephalitis		
COUNTY of RESIDENCE Delta	19	1	0	20	0
La Plata	16	0	1	17	0
Montrose	9	1	1	11	0
Mesa	105	10	10	125	3
Montezuma, Archuleta, Gunnison, Rio Blanco	4	3	1	8	
Garfield	**5**	**0**	**0**	**5**	**0**
State-wide Totals	**235**	**22**	**17**	**274**	**3**

*(** Data from the Colorado Department of Public Health and Environment website*

Ecologically, WNV seems to be somewhat different in the western Great Plains and intermountain West than farther east. Unlike in the Midwest, East Coast, and Southeast, reports of dead birds have proven to be a poor early indicator of WNV prevalence. Regionally, equine and human cases of WNV have been reported virtually simultaneously with the initial confirmation of avian cases. Symptoms of WNV vary widely depending upon the individual. Many otherwise healthy individuals infected with WNV will develop no symptoms at all, or mild flu like symptoms including generalized body aches, low fever, rash, and headache. These cases are rarely diagnosed because most individuals with these mild symptoms are not tested for the disease. In other individuals, more severe symptoms including high fever, severe headache, and nausea more often result in diagnosis of the

disease because the infected individual does go to the doctor. Surprisingly, a number of otherwise healthy individuals in their 30's to 50's have developed these moderately severe symptoms of WNV during 2004. Severe cases of WNV result in meningitis and/or encephalitis symptoms. In the severe cases the disease can be life threatening with those individuals over 50 or with suppressed immune systems being at the highest risk. Long term effects of the disease from severe or moderately severe cases can include brain damage, neurological disorders and paralysis.

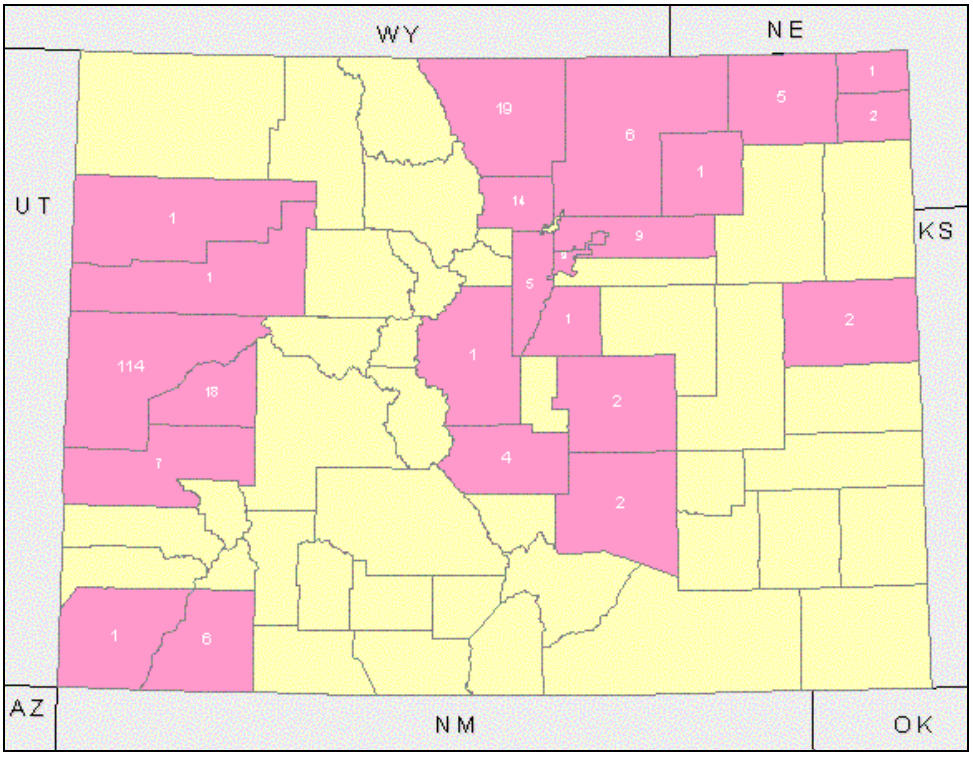
Distribution and Severity of Human WNV during 2004

During the 2004 summer season, WNV activity continued in much of the nation, with the brunt of the human cases being located in the western Great Plains region. Colorado residents (primarily west of the continental divide) suffered the highest number of WNV cases in the nation. Of the 1919 confirmed cases of WNV nationwide, 235 were reported from Colorado. The nearby states of Nebraska, South Dakota, Texas, Wyoming, California, Arizona, and Utah contributed an additional 1129 cases. Nationwide, the number of deaths associated with WNV stands at 61 with 3 of these coming from Colorado.* (* Center for Disease Control and Prevention website as of October 11, 2004)

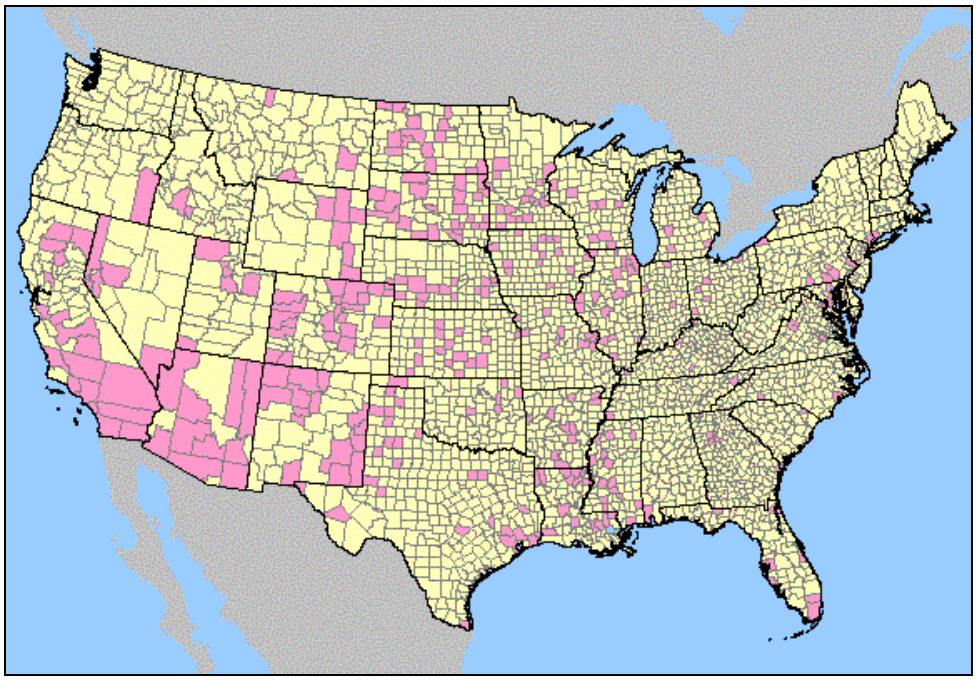
Data from the Colorado Department of Public Health and Environment (CDPHE) indicated Colorado had 235 human cases of WNV and 3 deaths for the season as of October 11, 2004. Most of the human cases in Colorado were located west of the continental divide, specifically in Mesa County. Mesa County comprised 53% of the total human West Nile Virus cases in Colorado and also had all of the three deaths.

Data from CDPHE indicates a statistically normal age distribution for cases of WNV, with a median age of 47 years. There was not a significant difference in the number of males and females testing positive for the virus.

On a local level, the distribution of human WNV cases seems to be centered on areas that had the highest numbers of total mosquitoes as well the highest percentage of Culex per pool. These areas had the highest averages for the season at PR-01 total mosquitoes=1458, average per trap night=81, percent culex 75.86%, RF-01 total mosquitoes=655, average per trap night=36.38, percent culex 25.19% and RF-02 total mosquitoes=378, average per trap night=21, percent culex 41.80%. Although the majority of traps still stayed at relatively low total numbers the culex population in most traps reached 15%-20% at a minimum. PR-01, RF-01, and RF-02 are the only trap pools that tested positive for West Nile Virus this season.



Human WNV in Colorado 2004



Human WNV in the United States 2004

Source: U.S. Geological Survey http:// westnilemaps.usgs.gov /us_human.html (Oct. 5, 2004)

Larval Mosquito Control

The foundation of any IPM based mosquito control program is larval mosquito control. Establishing an effective, comprehensive larval control program requires locating and mapping larval development sites, obtaining permission to access and treat the sites, and establishing procedures that insure regular inspections. Landowner participation is of primary importance in this aspect of mosquito control, and CMC utilizes several methods to contact landowners. Obviously, the best alternative is to speak directly with the landowner; however this is complicated by landowners who work off the property, or who do not live on the property. The most effective method to reach landowners who aren't home during the daytime is to leave information about the program and a card with a technicians name and the office telephone number on the door.

Once we contact the appropriate landowner, we give them information about who we are, why we are asking for permission to work on their property, and how the specific activity we wish to pursue on their property fits within the overall mosquito control program. CMC provides landowners any product related information they may want including pesticide labels and Material Safety Data Sheets (MSDS). We also answer any questions they may have regarding livestock, non-target species including bees, pets, and wildlife. Questions related to the costs of the control and who is paying for our services are often answered by CMC personnel. By being as forthright as possible, CMC is able to keep landowners and the general public informed about the program. Landowners are often an invaluable source of information about additional larval development sites and property ownership.

At the present time, there are 808 individual larval development sites divided into 8 areas and 34 routes. Undoubtedly, the number of sites and routes and sites will increase in the future if the control areas are maintained. It typically takes 2-3 seasons to locate and map the majority of larval development sites in an area. Based on past experience, CMC has likely mapped approximately 65 percent of the individual larval development sites located within the Garfield County mosquito control area. Larval control will improve as additional sites are located, and as permission is gained from landowners to work on sites currently mapped.

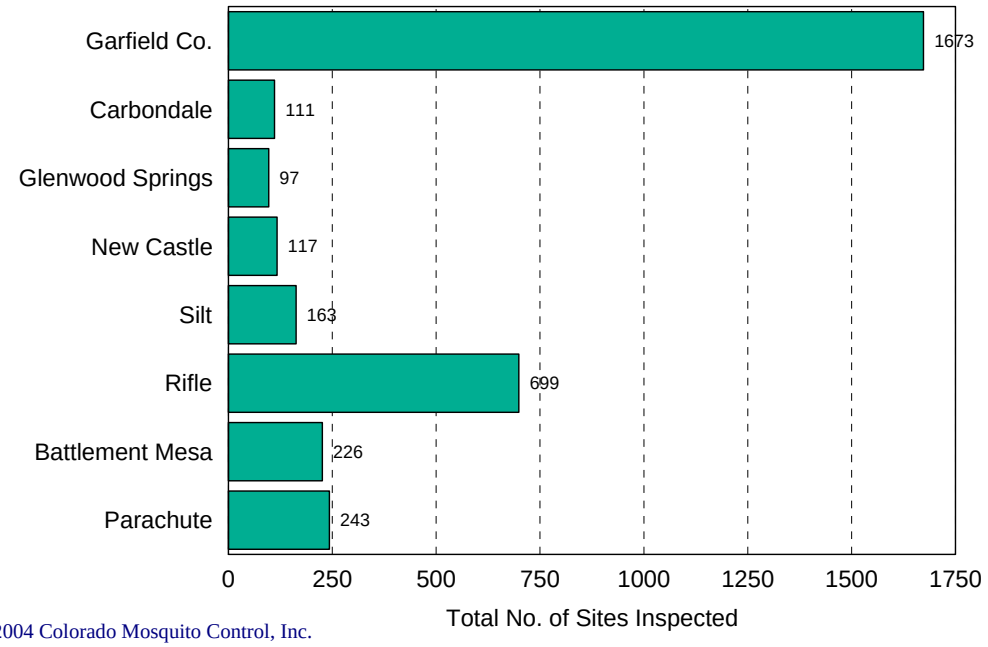
Larval Control Areas, Number of Routes, and Number of Sites.

Area	Number of Routes	Number of Sites
Parachute	2	46
Battlement Mesa	3	63
Rifle	7	169
Silt	2	42
New Castle	1	20
Glenwood Springs	2	29
Carbondale	2	34
Garfield County	15	408

During the 2004 season, technicians were able to inspect sites in each route on a weekly basis from early June through mid-September. Specific information regarding larval inspection and treatment is presented in the Appendix. If the current mosquito control boundaries are maintained during 2005, several problem areas have been identified for particular emphasis. These include the area east of the rodeo/baseball fields in Parachute, the Lyons Pond area in Rifle, Silt-Mesa on both sides of the Colorado River, south of Interstate Highway 70 in Silt, and the Roaring Fork River corridor along Highway 82 continuing to the county line. These areas are near human populations, and during 2004 had high populations of both *Culex* and *Aedes* mosquitoes. Mosquito control boundary maps, larval control routes, and CMC adult mosquito monitoring trap locations are included in the Appendix.

Larval Site Inspections by Service Area

2004 Garfield County Mosquito Control Program



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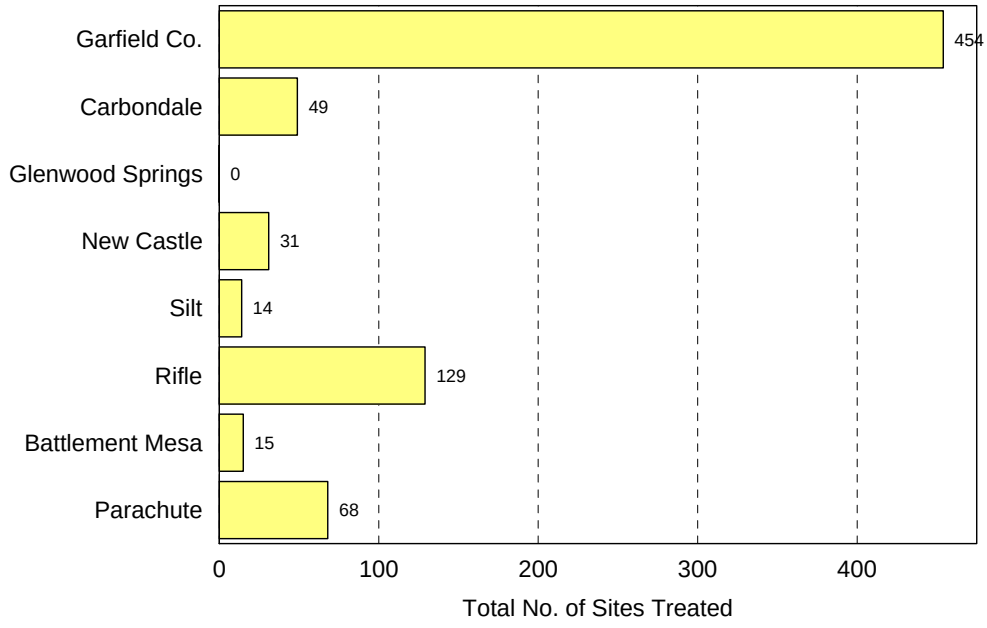
Larval Site Treatments by Service Area

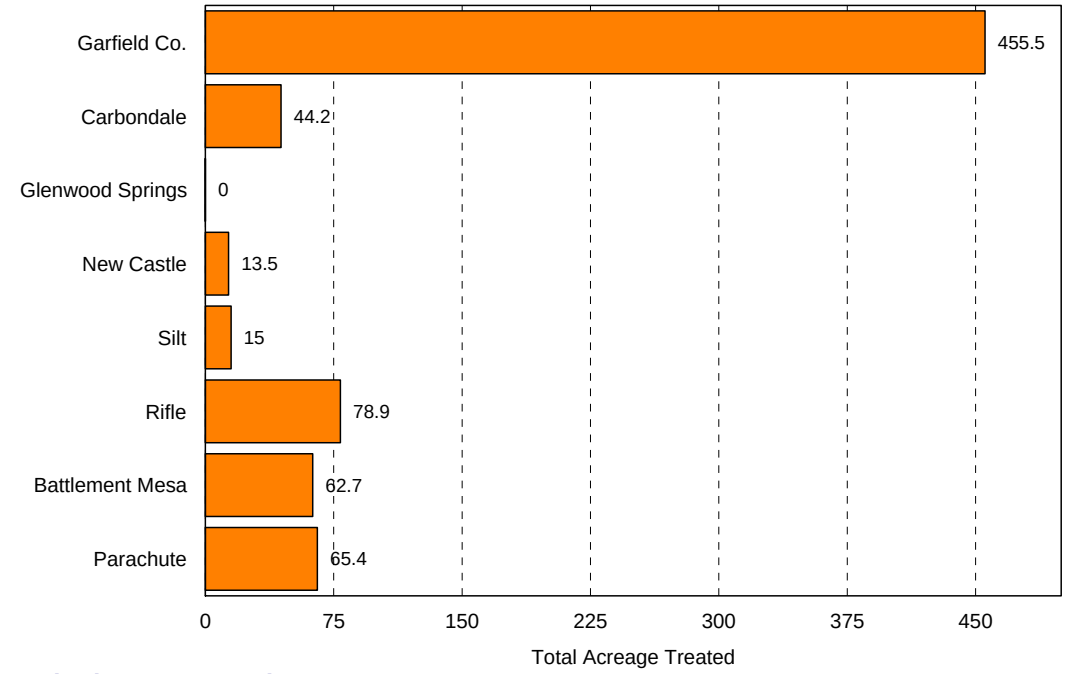
2004 Garfield County Mosquito Control Program



2004 Colorado Mosquito Control, Inc.

Larval Acreage Treated by Service Area

2004 Garfield County Mosquito Control Program



2004 Colorado Mosquito Control, Inc.

Adult Mosquito Surveillance

Adult mosquito population monitoring was an integral part of the IPM mosquito control program implemented in Garfield County during 2004. CMC set traps to monitor adult mosquito populations throughout the program area. Traps were set in the same location each week to maintain continuity of data, and to provide future comparative value. Some trap locations may be modified in the future to improve the surveillance significance of the traps.

Avian surveillance or sentinel chicken flocks within Garfield County were not a part of the services contracted. Adult mosquito traps were used to determine adult species present, relative abundance, and total adult mosquito population. This data was used to improve larval control, and to determine areas to be ULV adulticided.

In addition to the weekly traps, floater (CDC traps that move to different locations) traps were also set throughout the season in response to mosquito annoyance calls. Floater traps were also set in areas where CMC had not receive annoyance calls, but desired to assess the adult mosquito population.

Adult mosquito surveillance and control was initiated during the third week of May. In Garfield County, CMC set 10 CDC light traps and 2 gravid traps, divided into 2 trap routes. Each trap was set on a weekly basis, 16 to 18 times through the season. Colorado Mosquito Control's total number of CDC trap nights for the season was approximately 45 including "floater" traps; the total number of gravid trap nights for the season was 33.

. Specific data from each trap is included in the Appendix.

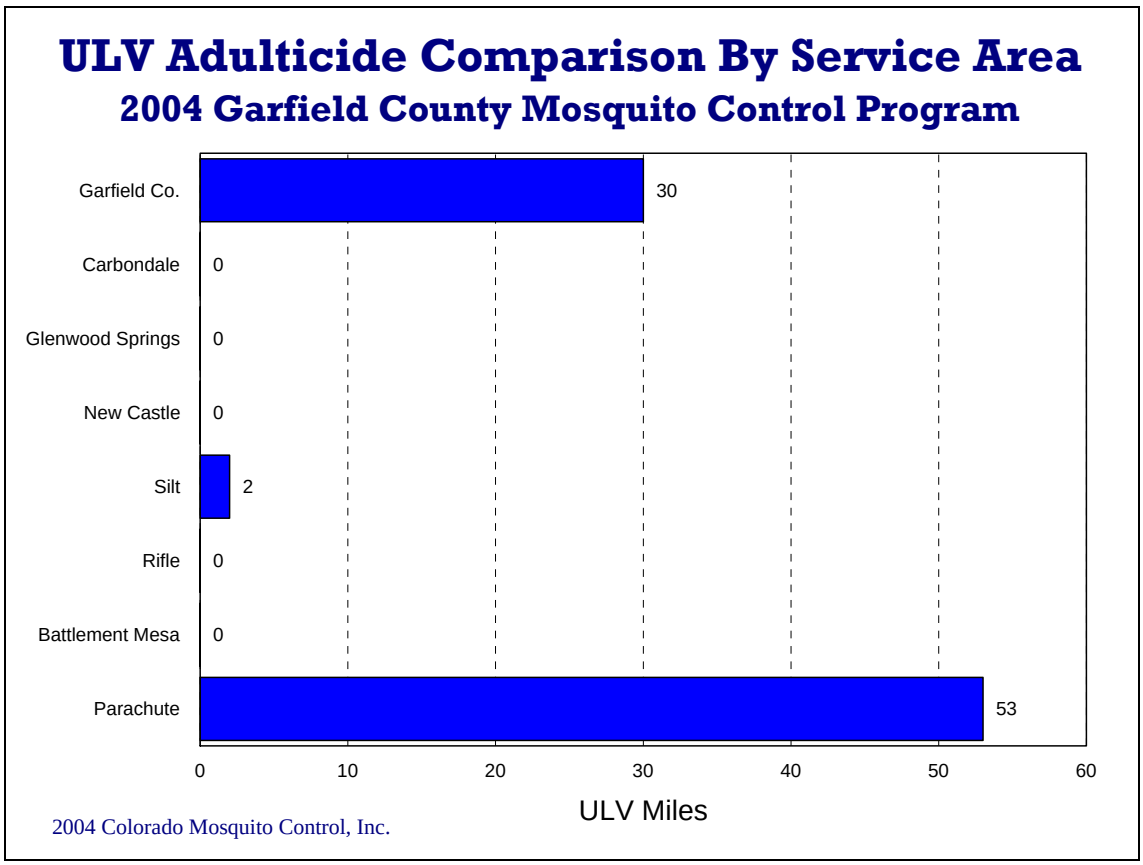
Adult Mosquito Control

Adult mosquito control via ultra low volume (ULV) spraying is an important part of any IPM based mosquito control program. Although fogging for adult mosquitoes is considered a last resort, when done properly it presents minimal environmental and human health risks. By applying an appropriate amount of product as very small (ULV) droplets after sunset, CMC is able to avoid significant non-target effects. None of the products registered in the United States for ULV mosquito control pose any risk of bioaccumulation or bio-magnification. All available products break down rapidly under environmental conditions, and are very easily metabolized by humans and domestic animals. The products however are very effective in killing adult mosquitoes.

By utilizing unbiased surveillance techniques and ULV fogging only those areas with high adult mosquito populations, CMC is able to minimize adult mosquito spraying. In Garfield County, CMC had a spray threshold of 100 adult female mosquitoes in a CO_2 baited light trap in one night. ULV fogging routes usually cover relatively large areas (several square miles) in an effort to reduce the mosquito population in a general area. For special events (like wedding receptions or family reunions), CMC offers a short term residual backpack barrier spray of an individual's property. If the general mosquito population is low to moderate, it is often more effective to spray an individual property to prevent a mosquito problem during a particular event. The barrier sprays typically are effective for a period of 2 to 4 days, and because of their residual properties may have significant effects to non-target insects in the area treated. Because of the low toxicity to humans and domestic animals, CMC uses a pyrethroid insecticide for these barrier treatments.

Throughout Garfield County we did very little adult mosquito control in comparison to the Front Range programs because of a few different factors. The first is the low trap numbers, although a few spots did become problems during the season, overall our trap numbers remained low and did not require a widespread truck ULV program. Also, we attempted to establish adult control as more of an emergency program. CMC believes that the notification/decision systems that each municipality utilized throughout the season worked well and we were able to get to the areas that needed adult control, without any problems. We recommend the same type of approach next year.

A brief summary of adult mosquito control activities within the Garfield County control area is presented in the following graph. More detailed data is presented in the Appendix.



Customer Service, Public Relations and Education

In any mosquito control program, but especially in the first year of the Garfield County Cooperative program, public relations, customer service and education represented a large percentage of the total time spent by CMC personnel over the summer. CMC makes every attempt to make these services as important as the actual control of mosquitoes. This service involves contact with government officials, media, and the public. CMC dealt with media personnel with the greatest courtesy, responsiveness, and professionalism. All requests for interviews were accepted and dealt with by management staff. Calls from residents of the mosquito control areas also increased dramatically. Each of these calls was given the same weight as those from the media.

Customer Service

Customer service needs to be the number one priority of any business and CMC makes no exception. Over the season, CMC made many improvements in this area. A new format for recording incoming calls was developed which helped to better identify the reason for the call and aided in distribution to the correct office, department and the subsequent resolution. Each call is considered equally important and was treated as such with a resolution usually taking place in 1-2 days. Colorado Mosquito Control encouraged residents to call the Mosquito Hotline with complaints. Complaint calls are used as a secondary indicator of where mosquito populations are high and causing human annoyance problems. This enabled us to pinpoint localized problem areas and to target larval and adult control operations and increase overall control effectiveness. The largest and perhaps most important call type was to report new potential larval sites. These are calls from residents reporting standing water on properties or along roadways which can be attributed to increased education efforts discussed later in this section.

Another aspect of CMC's customer service is the notification and shutoff list. CMC prides itself in making every attempt possible to accommodate the needs and wishes of the residents of the Garfield County mosquito control program area. The database of requests including names, addresses, and phone numbers is continually updated and checked before any spraying application. Requests for phone notification before spraying and shutoff requests in front of and upwind from addresses are always honored. This program continues to be well received and much appreciated by residents.

Education

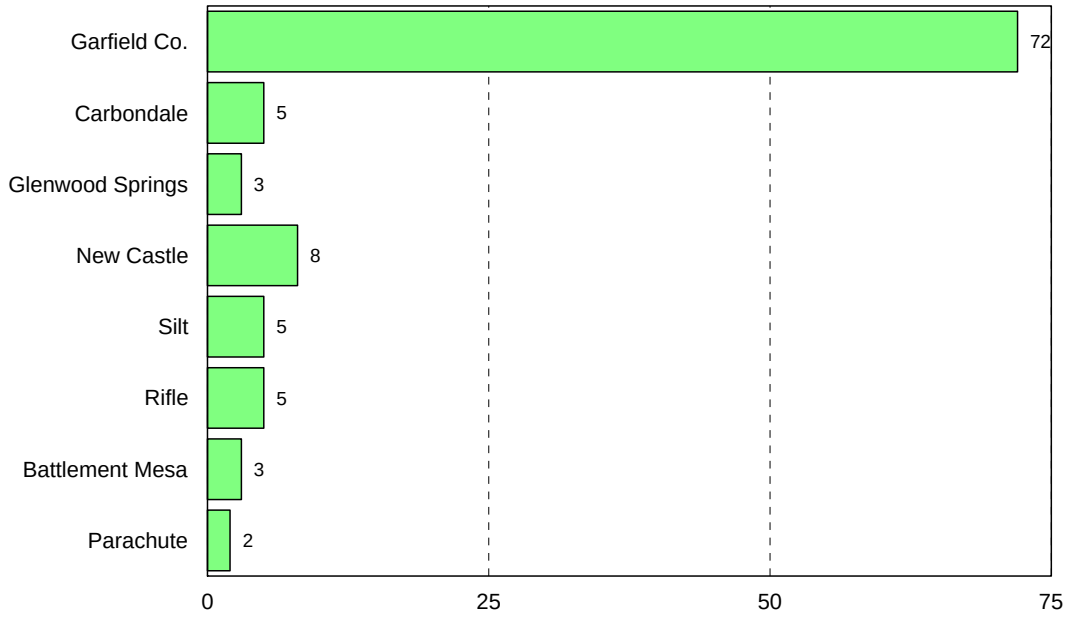
Increased press coverage of WNV and the aggressive State sponsored "Fight the Bite Colorado" campaigns helped to increase awareness of mosquitoes and their biology. Source reduction to eliminate mosquito habitat is perhaps the largest single tactic individual homeowners can do to reduce the number of mosquitoes in their area. Simple methods include checking for standing water around the house in common items such as buckets, rain gutters, and bird baths. This increased awareness of standing water also prompted the public to look for standing water in other places as well. New larval site calls consisted of approximately 44.73% of the total calls taken by CMC from residents in 2004. Although many of these areas were previously mapped, many new areas were found and added to our regular larval site inspection database and maps.

For next year CMC believes that the County, and municipalities should focus the education portion of the program again on personal responsibility, putting the power in the hands of the resident. This includes a continued effort on spreading the word about insect repellant, clearing any breeding areas they can and being responsible near dawn and dusk. Also, it is important to mold our mosquito hotline into the first place a resident calls when they have any mosquito related problems or questions. The longer a program exists in an area the more comfortable people become with using the service. This season, the call numbers were low because most residents were still unaware that our service existed.

The information in the following table is a brief summary of the calls received by CMC offices relative to mosquito control activity in Garfield County. Due to confidentiality concerns more detailed information by call is available upon request from municipal officials.

MosquitoLine Calls by Service Area

2004 Garfield County Mosquito Control Program



2004 Colorado Mosquito Control, Inc.

Summary

During the spring and summer of 2004, Garfield County in cooperation with 7 municipalities implemented a large and aggressive mosquito control campaign under contract with Colorado Mosquito Control, Inc. That campaign was a direct result of the threat of West Nile Virus to humans and domestic livestock within the county.

Normally the initial season of any mosquito control program, particularly a biologically sound IPM program is the most difficult. The efforts can often seem disorganized and chaotic with the overwhelming amount of information to be processed and the near impossible task of accomplishing all the work that needs to be done. The managers and foremen assembled by CMC to work on the new Garfield County program all have extensive knowledge, several with advanced degrees directly related to the program, and wide-ranging biological field experience.

Over the 18 years since its inception, Colorado Mosquito Control, Inc. has successfully established IPM mosquito control programs throughout the State of Colorado. Invariably, it takes two to three seasons to implement a program to a level that it can be considered effective, and no program is ever through being refined. Based on past experience, about 65 percent of the larval development sites within the control area were identified and mapped during 2004. Considering the extent of the task, the effort in Garfield County could not have gone better.

The challenge was daunting considering the huge geographic area, the amount of field work to be done, the number of entities involved, and the diversity of the people and geography of the mosquito control area. The only major operational problem was underestimating the huge amount of consistent breeding areas in Garfield County. Once, CMC had a better understanding of the habitat, it was easy to alter our procedures to better match Garfield County and it's widely diverse terrain. Overall the 2004 season was very successful and a great deal was accomplished in the areas of public education and larval mosquito site mapping and control. The level of cooperation between CMC and the County and municipal entities was unprecedented, and the relative lack of serious technical and public relations problems provided for a smooth season.

Despite all the effort and the accomplishments of the program, it proved impossible to prevent a few WNV cases during the 2004 season. No one thought that the program would eliminate WNV completely; however the weather and the wide-scale larvicide program did reduce the mosquito population overall, and the adult surveillance program created good data on the population of vector *Culex*

mosquitoes. Nearby counties experienced higher numbers of cases and even some human deaths. Overall, we believe that the Garfield County program reduced the potential threat of WNV and most likely the number of WNV human cases.

CMC is proud of the service it has provided Garfield County residents and we look forward to serving their needs in the seasons to come. Though the 2004 mosquito season was a learning experience for Colorado Mosquito Control, Inc. and for the Garfield Cooperative Mosquito Control Program we believe that a huge amount of the initial groundwork has been completed. We know that there is always room for improvement and have high expectations for program enhancement and new successes in future years. A special thanks to the municipalities, the members of the Garfield County West Nile Task Force, and Steve Anthony for their confidence, support and direction. Your help made this season a huge success.

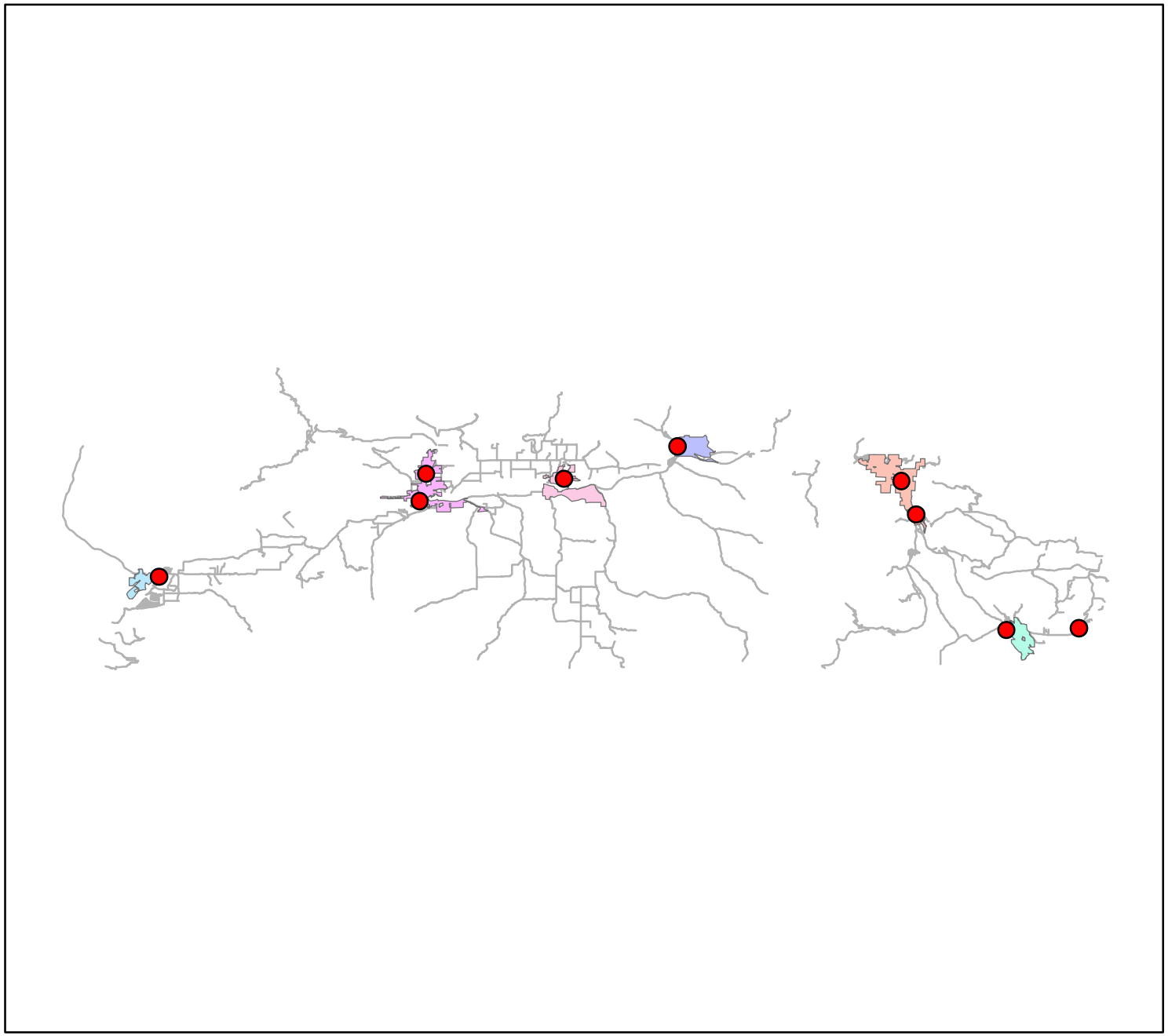
Mosquito Control Program Larval Data Summary

By Date ***Beginning Date:*** **5/12/2004** ***Ending Date:*** **9/28/2004**

Service Area	*Total Sites Inspected*	*No. of Wet Sites*	*Percentage of Wet Sites*	*No. of Sites Treated*	*Percentage Breeding**	*Total Acres Treated*
Battlement Mesa	226	93	41.15%	15	16.13%	62.7
Carbondale, Town of	111	105	94.59%	49	46.67%	44.2
Garfield County Unincorp	1673	1025	61.27%	454	44.29%	455.5
Glenwood Springs, City o	97	11	11.34%	0	0.00%	0.0
New Caslte, Town of	117	94	80.34%	31	32.98%	13.5
Parachute, Town of	243	137	56.38%	68	49.64%	65.4
Rifle, Town of	699	353	50.50%	129	36.54%	78.9
Silt, Town of	163	27	16.56%	14	51.85%	15.0

**** (Sites Treated/Sites Wet)***

2004 Garfield County Cooperative Mosquito Control Program
Surveillance Trap Locations



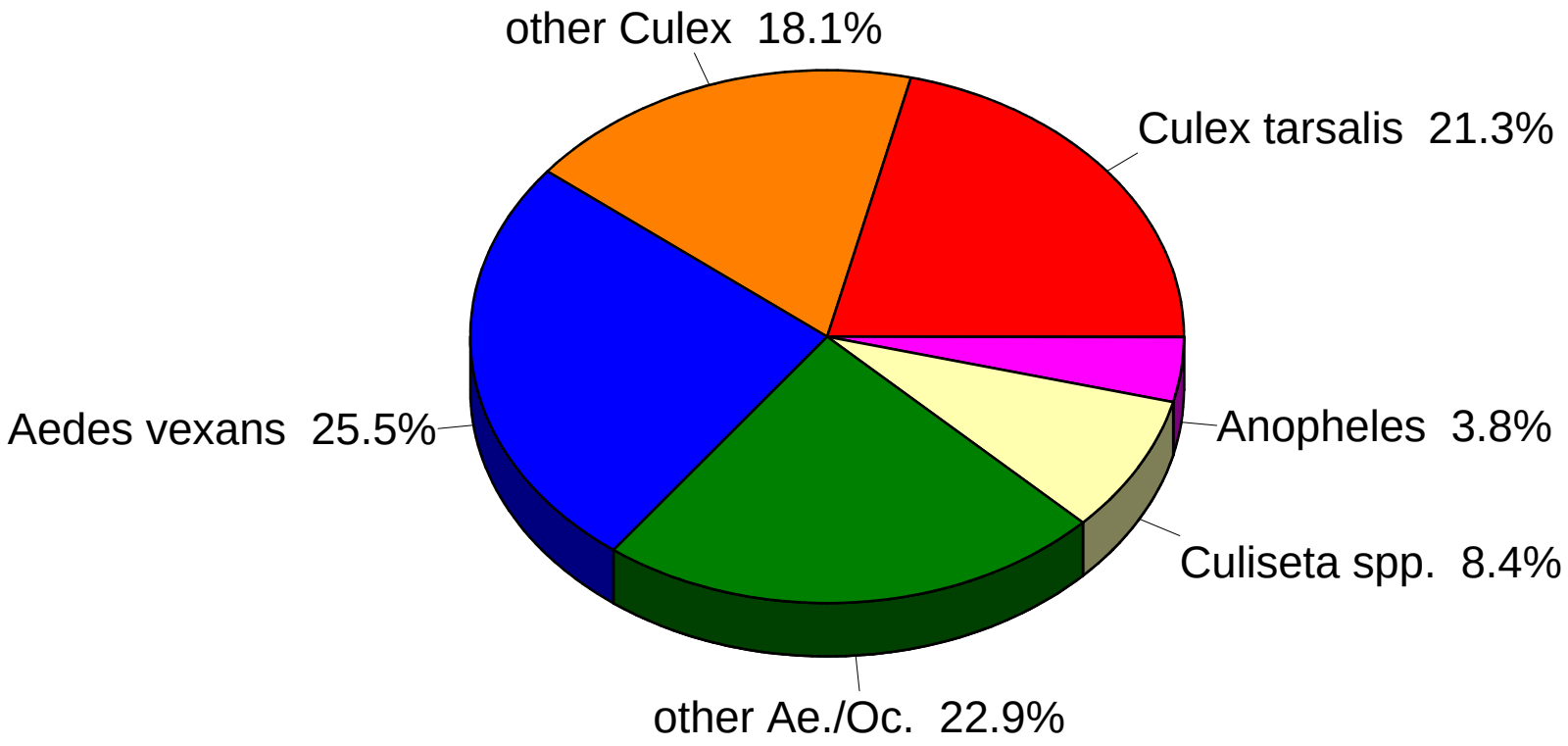
Map Legend

- Garfield County Trap Locations
- Carbondale
- Glenwood Springs
- New Castle
- Parachute
- Rifle
- Silt
- Roads

Miles

0 5 10 20 30 40

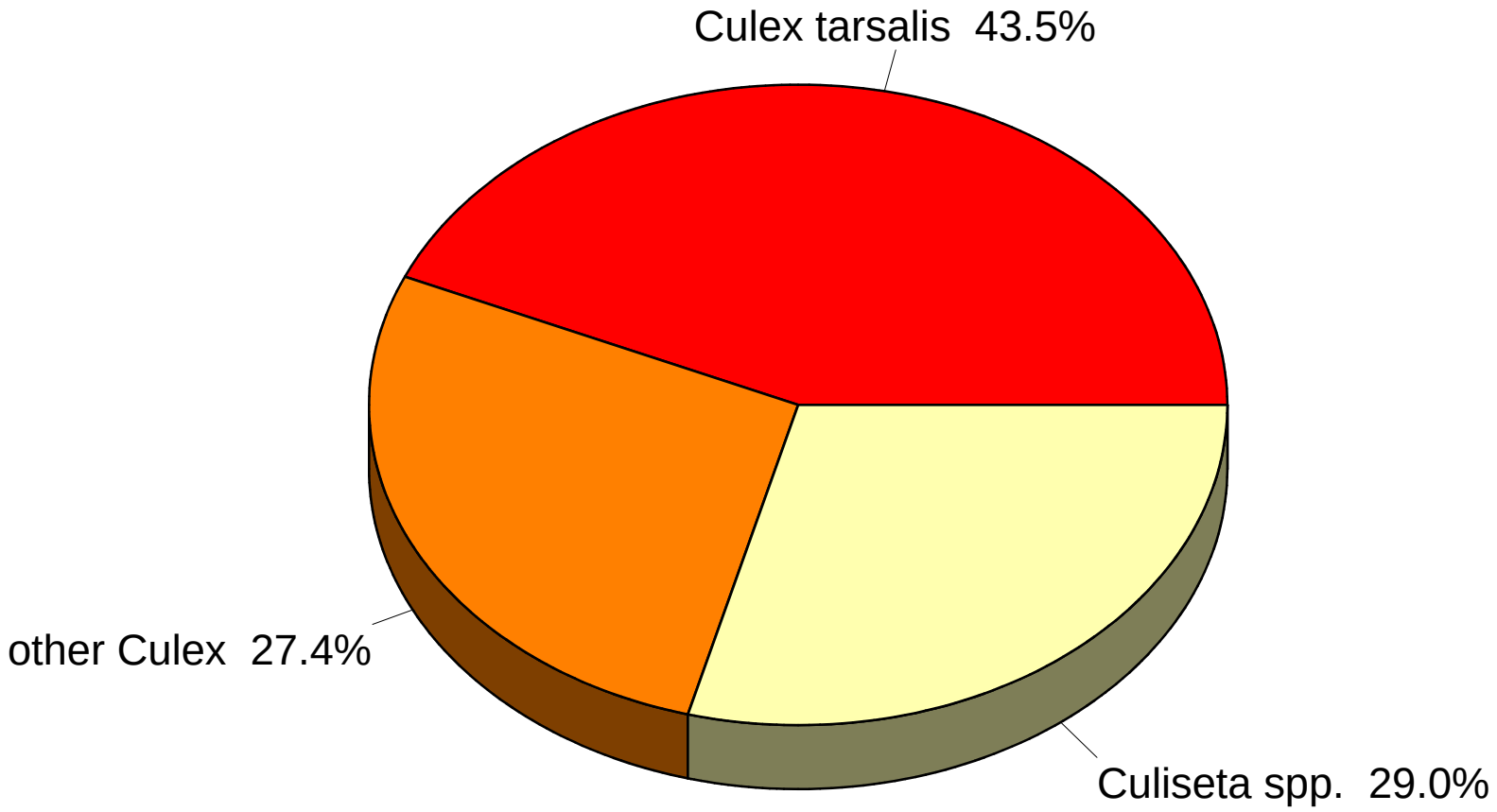
2004 Garfield County CDC Mosquito Surveillance Trap Data



Total of 5,786 mosquitoes collected over 224 trap/nights
(= ave. 26 mosquitoes per trap/night)

2004 Colorado Mosquito Control, Inc.

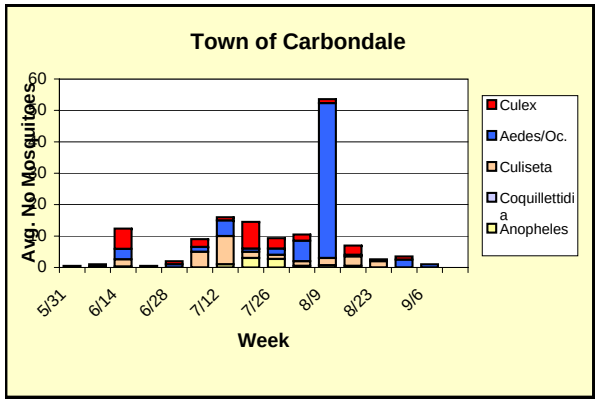
2004 Garfield County Gravid Mosquito Surveillance Trap Data

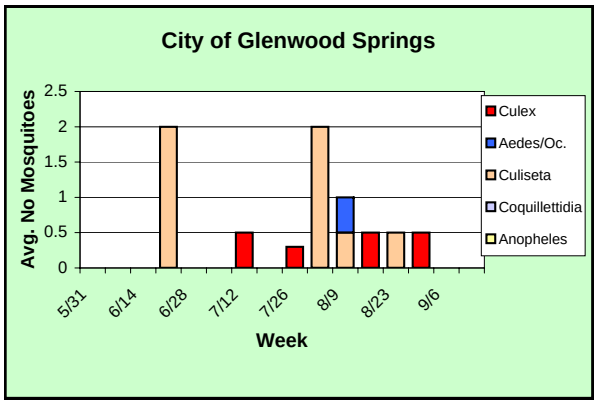


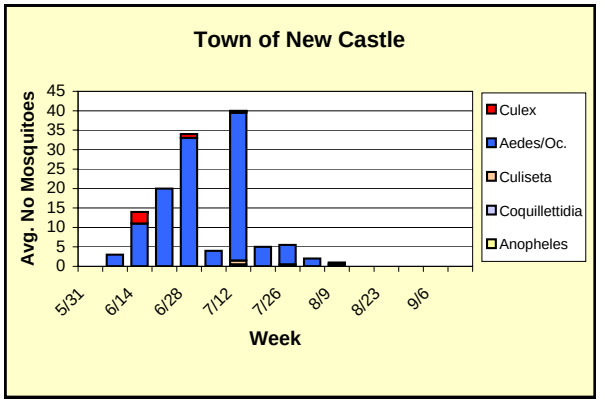
Total of 62 mosquitoes collected over 33 trap/nights
(= ave. 2 mosquitoes per trap/night)

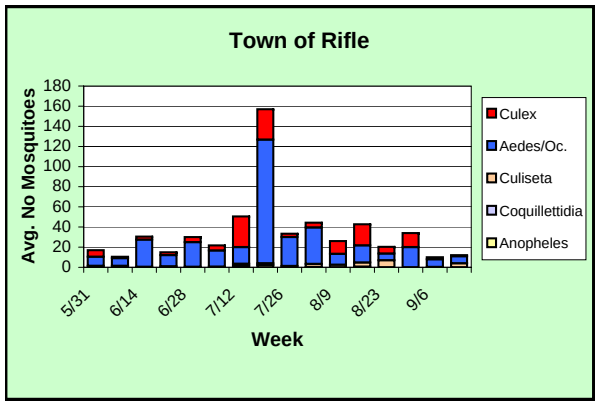
2004 Colorado Mosquito Control, Inc.

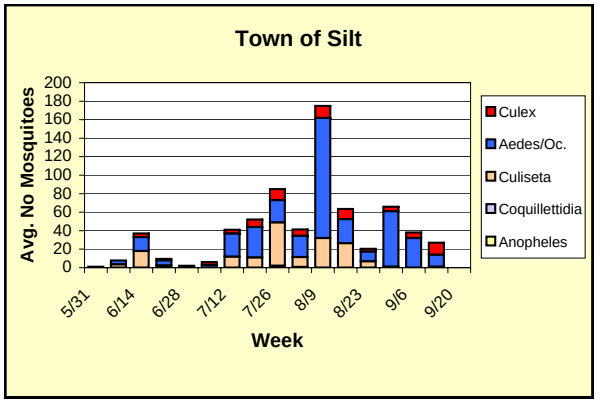
2004 Garfield County Cooperative Mosquito Control Program
Weekly CDC Trap Mosquito Population Summary
(Scale varies by chart)

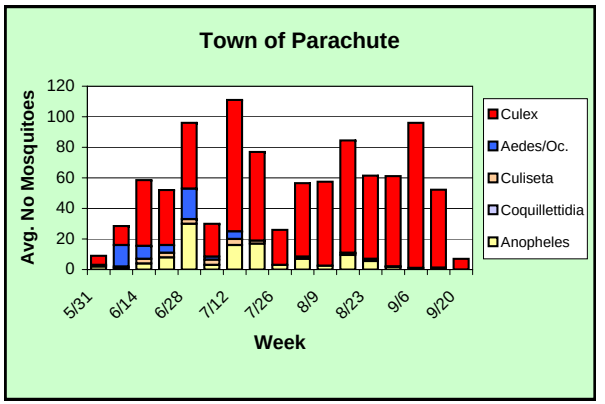


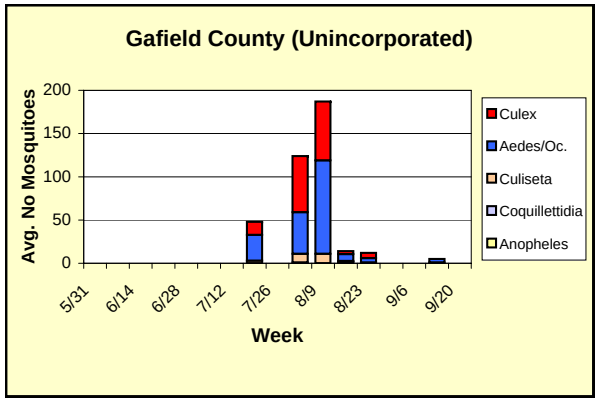


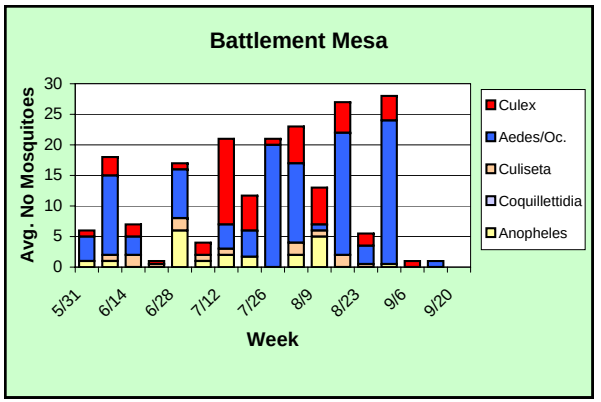


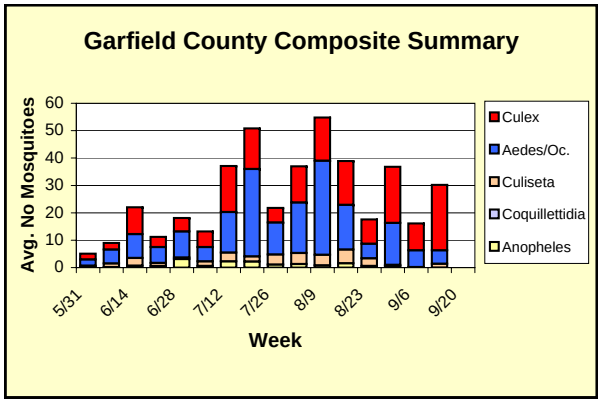












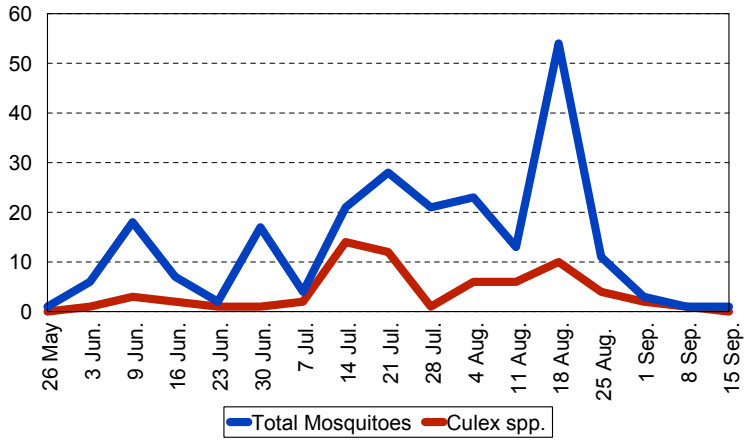
Colorado Mosquito Control, Inc. 2004

This data sheet is the confidential work product of Colorado Mosquito Control, Inc. and is protected by state federal statutes.

BM-01: Battlement Mesa

Trap Type: Light/CO_2
Location: Battlement Mesa, behind Crown Peak Baptist Church off West Battlement Parkway
GPS: N39° 27.195', W108° 2.055'

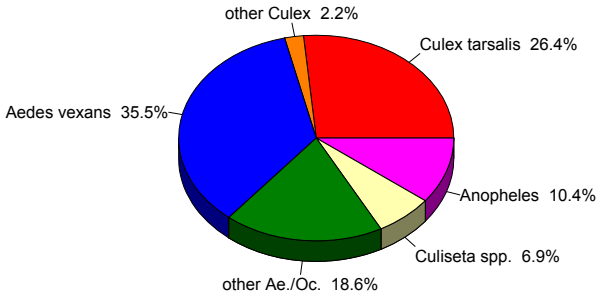
Total number of trap/nights set: 17
Total number of mosquitoes collected: 231
Average mosquitoes per trap/night: 14



Species collected:
Aedes vexans
Ochlerotatus dorsalis
Ochlerotatus melanimon
Ochlerotatus nigromaculis
Anopheles hermsi
Culex tarsalis
Culex pipiens
Culiseta inornata
Culiseta incidens

Species abundance:

Species	Number	Percent of Total
Aedes vexans	82	35.5%
Other *Aedes/Ochlerotatus*	43	18.6%
Anopheles hermsi	24	10.4%
Culex tarsalis	61	26.4%
Other *Culex*	5	2.2%
Culiseta spp.	16	6.9%

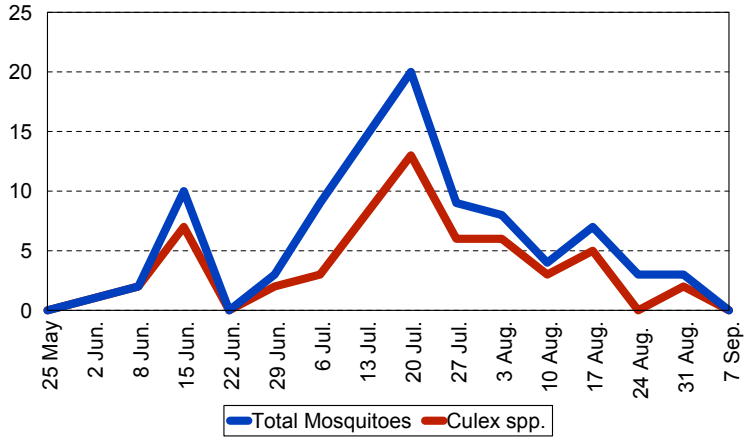


West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

CD-01: Carbondale Crystal River

Trap Type: Light/CO_2
Location: Carbondale, along Crystal River in backyard of 111 Indica Way
GPS: N39° 24.109', W107° 13.652'

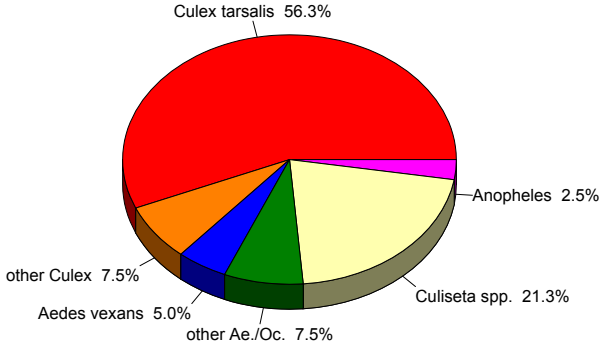
Total number of trap/nights set: 15
Total number of mosquitoes collected: 79
Average mosquitoes per trap/night: 5



Species collected:
Aedes vexans
Ochlerotatus dorsalis
Ochlerotatus trivittatus
Ochlerotatus increpitus
Ochlerotatus nigromaculis
Anopheles hermsi
Culex tarsalis
Culex pipiens
Culex erythrothorax
Culiseta inornata
Culiseta incidens

Species abundance:

Species	Number	Percent of Total
Aedes vexans	4	5.0%
Other *Aedes/Ochlerotatus*	6	7.5%
Anopheles hermsi	2	2.5%
Culex tarsalis	45	56.3%
Other *Culex*	6	7.5%
Culiseta spp.	17	21.3%

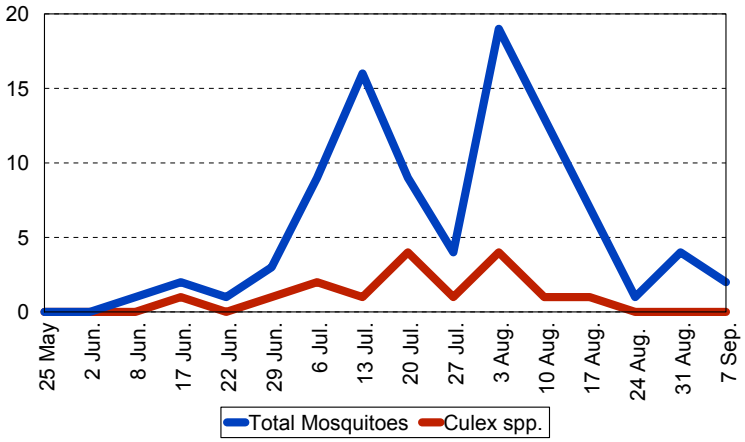


West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

CD-02: Carbondale Beaver Ponds

Trap Type: Light/CO_2
Location: Carbondale, in Saint Finbar "neighborhood" Behind Aspen Equestrian Center
GPS: N39° 24.229', W107° 9.512'

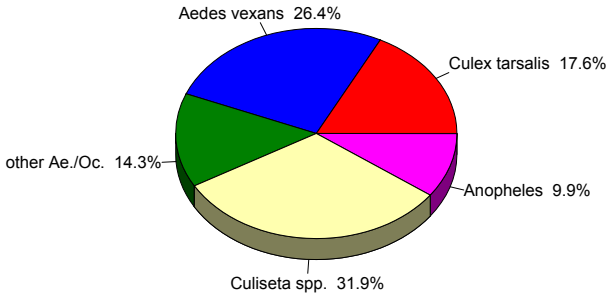
Total number of trap/nights set: 16
Total number of mosquitoes collected: 91
Average mosquitoes per trap/night: 6



Species collected:
Aedes vexans
Ochlerotatus dorsalis
Ochlerotatus increpitus
Anopheles hermsi
Culex tarsalis
Culiseta inornata

Species abundance:

Species	Number	Percent of Total
Aedes vexans	24	26.4%
Other *Aedes*/*Ochlerotatus*	13	14.3%
Anopheles hermsi	9	9.9%
Culex tarsalis	16	17.6%
Other *Culex*	0	0.0%
Culiseta inornata	29	31.9%

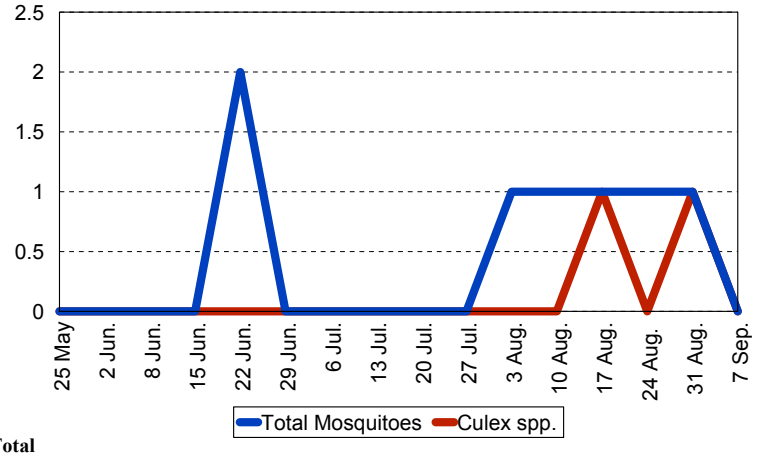


West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

GW-01: Glenwood Springs Colorado Mosquito Control Office

Trap Type: Light/CO_2
Location: Glenwood Springs, in back corner of Office parking lot above the river
GPS: N39° 32.614', W107° 19.700'

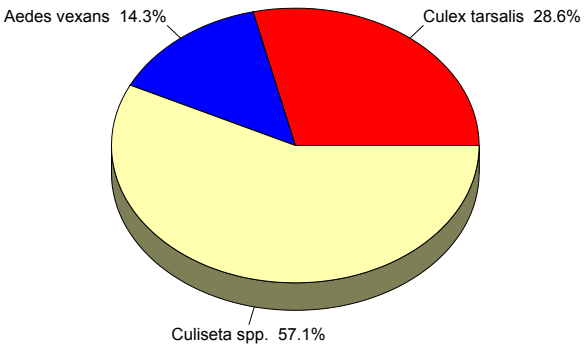
Total number of trap/nights set: 16
Total number of mosquitoes collected: 7
Average mosquitoes per trap/night: 0



Species collected:
Aedes vexans
Culex tarsalis
Culiseta inornata
Culiseta incidens

Species abundance:

Species	Number	Percent of Total
Aedes vexans	1	14.3%
Other *Aedes*/*Ochlerotatus*	0	0.0%
Anopheles hermsi	0	0.0%
Culex tarsalis	2	28.6%
Other *Culex*	0	0.0%
Culiseta spp.	4	57.1%



West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

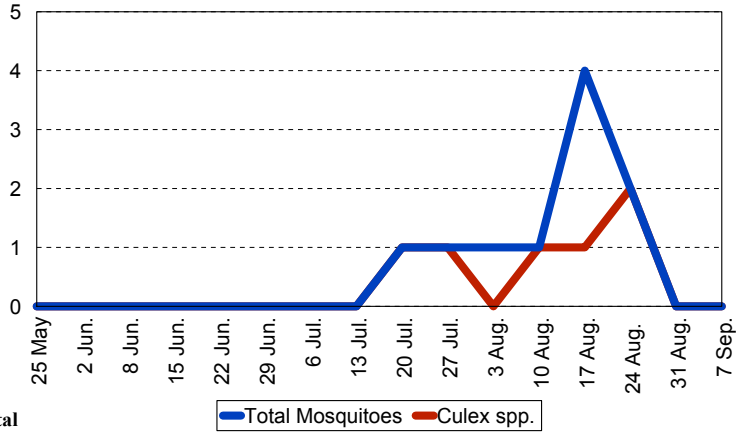
[see also results for the Gravid trap at this location (GW-01gr)]

GW-01gr: Glenwood Springs Colorado Mosquito Control Office

Trap Type: Gravid
Location: Glenwood Springs, in back corner of Office parking lot above the river
GPS: N39° 32.614', W107° 19.700'

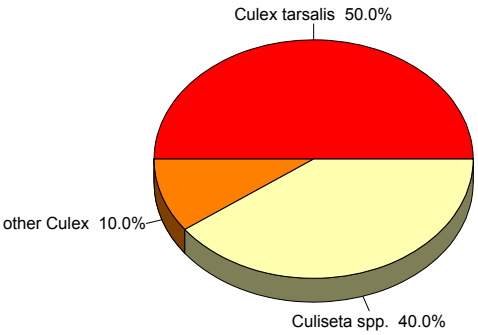
Total number of trap/nights set: 16
Total number of mosquitoes collected: 10
Average mosquitoes per trap/night: 1

Species collected:
Culex tarsalis
Culex pipiens
Culiseta inornata
Culiseta incidens



Species abundance:

Species	Number	Percent of Total
Aedes vexans	0	0.0%
Other *Aedes/Ochlerotatus*	0	0.0%
Anopheles hermsi	0	0.0%
Culex tarsalis	5	50.0%
Other *Culex*	1	10.0%
Culiseta spp.	4	40.0%



West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

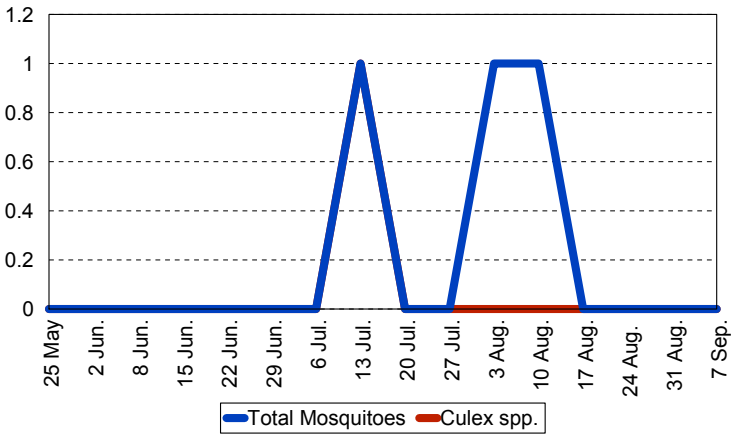
[see also results for the Light/CO_2 trap at this location (GW-01)]

GW-02: Glenwood Springs South

Trap Type: Light/CO_2
Location: Glenwood Springs, Glenwood Park Recreation Area at Mt. Sopris Drive and Old Lodge Drive
GPS: N39° 30.741', W107° 18.832'

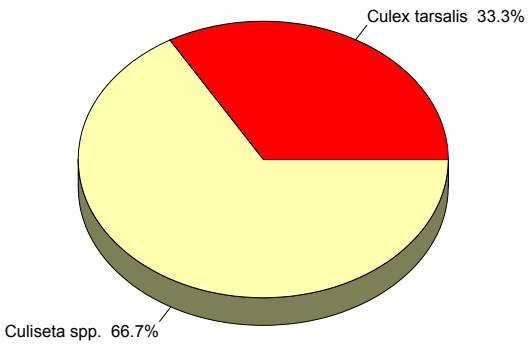
Total number of trap/nights set: 16
Total number of mosquitoes collected: 3
Average mosquitoes per trap/night: 0

Species collected:
Culex tarsalis
Culiseta inornata



Species abundance:

Species	Number	Percent of Total
Aedes vexans	0	0.0%
Other *Aedes/Ochlerotatus*	0	0.0%
Anopheles hermsi	0	0.0%
Culex tarsalis	1	33.3%
Other *Culex*	0	0.0%
Culiseta inornata	2	66.7%



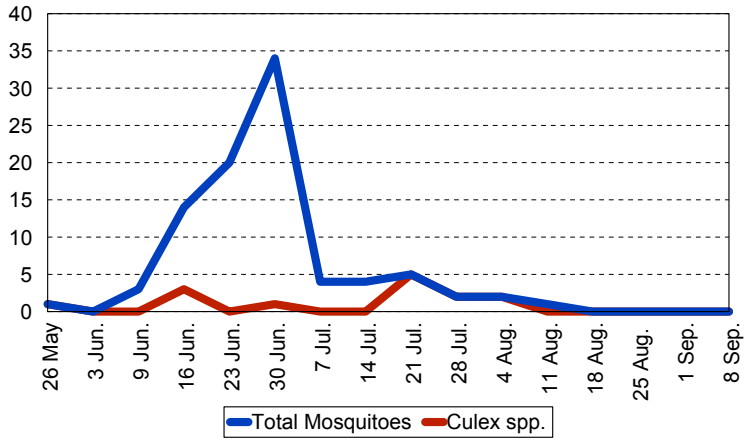
West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

NC-01: New Castle

Trap Type: Light/CO_2
Location: New Castle, in drainage across from 421 Rio Grande Avenue
GPS: N39° 34.625', W107° 32.437'

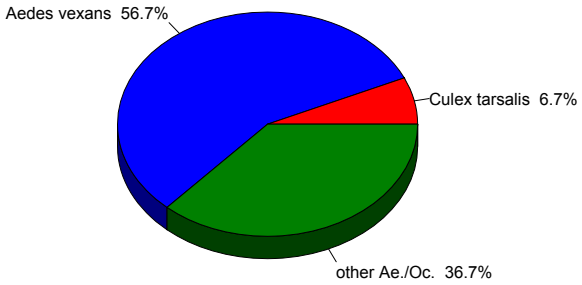
Total number of trap/nights set: 15
Total number of mosquitoes collected: 90
Average mosquitoes per trap/night: 6

Species collected:
Aedes vexans
Aedes cinereus
Ochlerotatus melanimon
Ochlerotatus increpitus
Ochlerotatus nigromaculis
Ochlerotatus sp.
Culex tarsalis



Species abundance:

Species	Number	Percent of Total
Aedes vexans	51	56.7%
Other *Aedes*/*Ochlerotatus*	33	36.7%
Anopheles hermsi	0	0.0%
Culex tarsalis	6	6.7%
Other *Culex*	0	0.0%
Culiseta spp.	0	0.0%



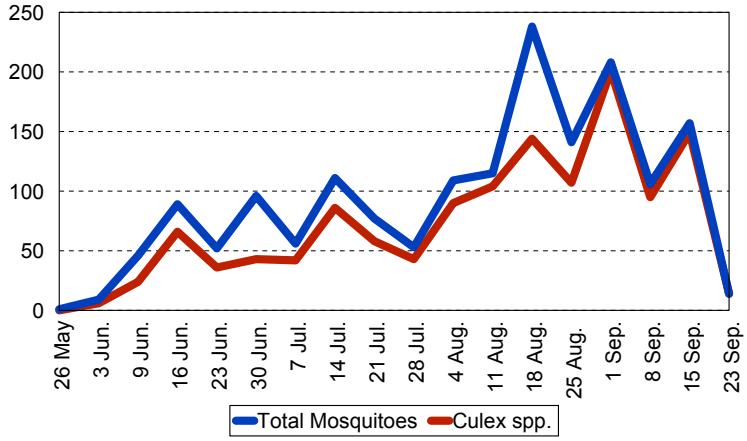
West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

PR-01: Parachute Cottonwood Park

Trap Type: Light/CO_2
Location: Parachute, west of Cottonwood Park next to fishing/wildlife-watching ponds
GPS: N39° 26.603', W108° 2.901'

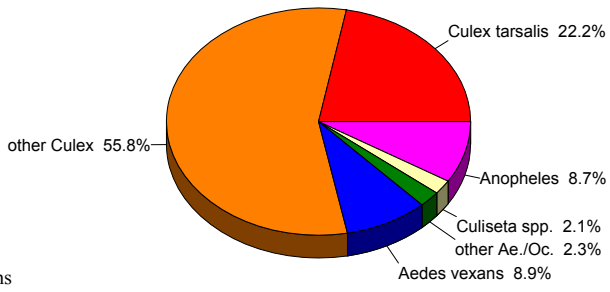
Total number of trap/nights set: 18
Total number of mosquitoes collected: 1678
Average mosquitoes per trap/night: 93

Species collected:
Aedes vexans
Ochlerotatus dorsalis
Ochlerotatus melanimon
Ochlerotatus increpitus
Ochlerotatus nigromaculis
Anopheles hermsi
Culex tarsalis
Culex pipiens
Culex erythrothorax
Culiseta inornata



Species abundance:

Species	Number	Percent of Total
Aedes vexans	150	8.9%
Other *Aedes*/*Ochlerotatus*	39	2.3%
Anopheles hermsi	146	8.7%
Culex tarsalis	372	22.2%
Other *Culex*	936	55.8%
Culiseta inornata	35	2.1%

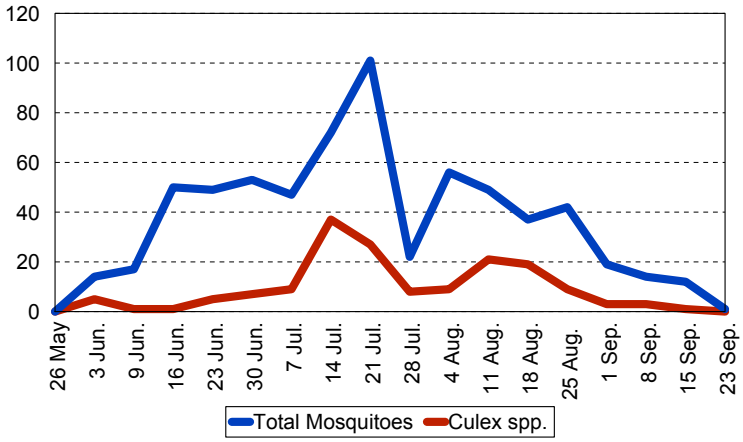


West Nile Virus Testing – A mosquito pool that included specimens from this trap site tested positive for WNV on 26 August 2004.

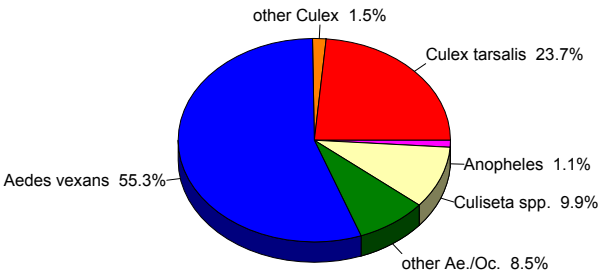
RF-01: Rifle Lyons Park Rest Area

Trap Type: Light/CO_2
Location: Rifle, next to marsh south of Lyons Park Rest Area
GPS: N39° 31.509', W107° 47.137'

Total number of trap/nights set: 18
Total number of mosquitoes collected: 655
Average mosquitoes per trap/night: 36



Species collected:
Aedes vexans
Aedes cinereus
Ochlerotatus dorsalis
Ochlerotatus melanimon
Ochlerotatus trivittatus
Ochlerotatus increpitus
Ochlerotatus nigromaculis
Anopheles hermsi
Culex tarsalis
Culex pipiens
Culex erythrothorax
Culiseta inornata
Culiseta incidens



Species abundance:

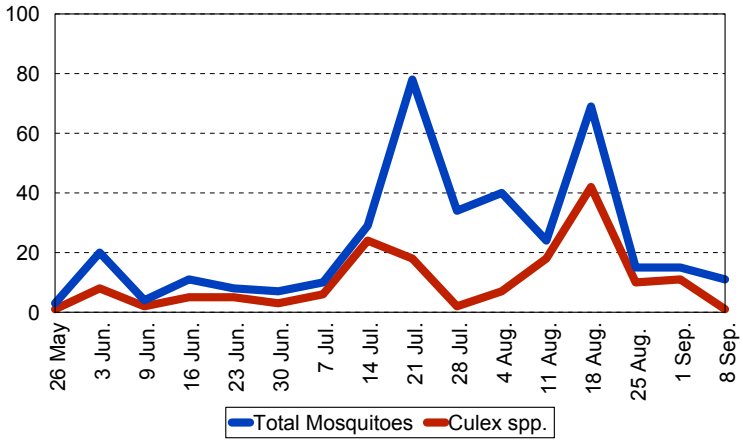
Species	Number	Percent of Total
Aedes vexans	362	55.3%
Other *Aedes/Ochlerotatus*	56	8.5%
Anopheles hermsi	7	1.1%
Culex tarsalis	155	23.7%
Other *Culex*	10	1.5%
Culiseta spp.	65	9.9%

West Nile Virus Testing – A mosquito pool that included specimens from this trap site tested positive for WNV on 1 September 2004 (pool also included specimens from RF-02).

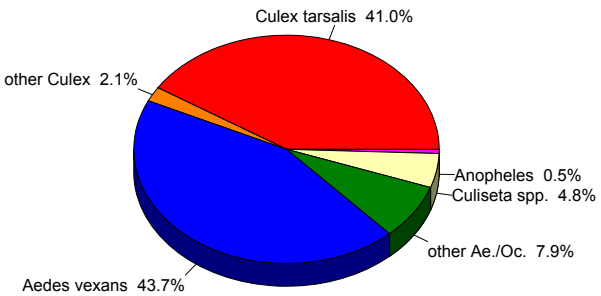
RF-02: Rifle White River Avenue at Highway 13

Trap Type: Light/CO_2
Location: Rifle, next to marsh at White River Avenue and Colorado Highway 13
GPS: N39° 33.041', W107° 46.818'

Total number of trap/nights set: 16
Total number of mosquitoes collected: 378
Average mosquitoes per trap/night: 24



Species collected:
Aedes vexans
Ochlerotatus dorsalis
Ochlerotatus melanimon
Ochlerotatus increputus
Ochlerotatus nigromaculis
Ochlerotatus sp.
Anopheles hermsi
Culex tarsalis
Culex pipiens
Culiseta inornata



Species abundance:

Species	Number	Percent of Total
Aedes vexans	165	43.7%
Other *Aedes/Ochlerotatus*	30	7.9%
Anopheles hermsi	2	0.5%
Culex tarsalis	155	41.0%
Other *Culex*	8	2.1%
Culiseta inornata	18	4.8%

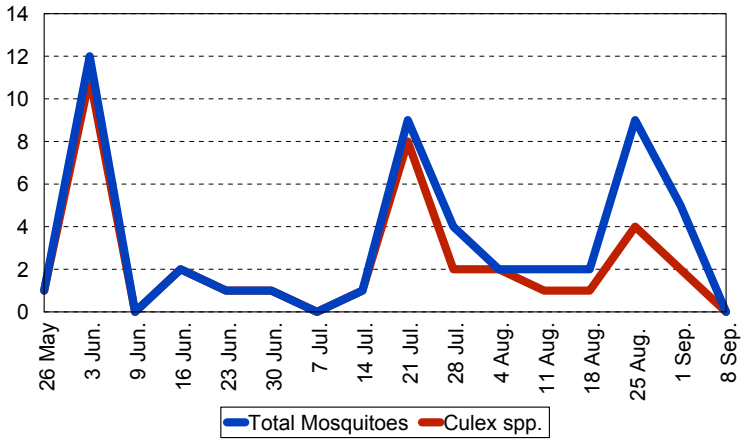
West Nile Virus Testing – A mosquito pool that included specimens from this trap site tested positive for WNV on 1 September 2004 (pool also included specimens from RF-01).

[see also results for the Gravid trap at this location (RF-02gr)]

RF-02gr: Rifle White River Avenue at Highway 13

Trap Type: Gravid
Location: Rifle, next to marsh at White River Avenue and Colorado Highway 13
GPS: N39° 33.041', W107° 46.818'

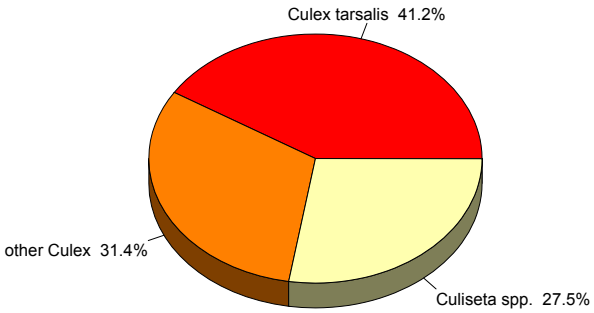
Total number of trap/nights set: 16
Total number of mosquitoes collected: 51
Average mosquitoes per trap/night: 3



Species collected:
Culex tarsalis
Culex pipiens
Culiseta inornata
Culiseta incidens

Species abundance:

Species	Number	Percent of Total
Aedes vexans	0	0.0%
Other *Aedes/Ochlerotatus*	0	0.0%
Anopheles hermsi	0	0.0%
Culex tarsalis	21	41.2%
Other *Culex*	16	31.4%
Culiseta spp.	14	27.5%



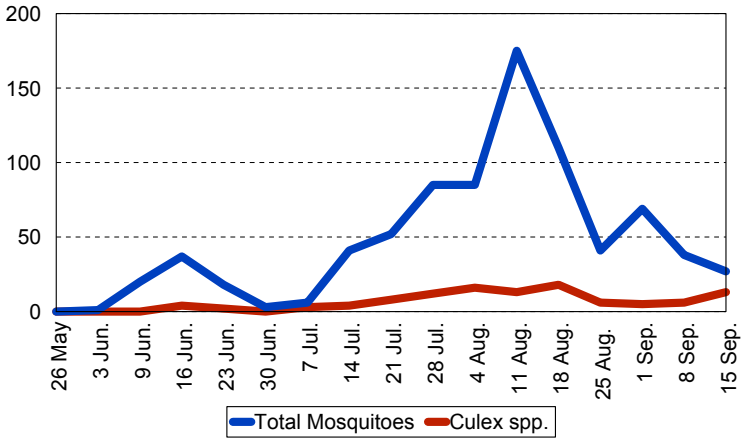
West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

[see also results for the Light/CO_2 trap at this location (RF-02)]

SI-01: Silt

Trap Type: Light/CO_2
Location: Silt, along marsh west of Bekins Mini-Storage off U.S. Hwy. 6
GPS: N39° 32.756', W107° 38.950'

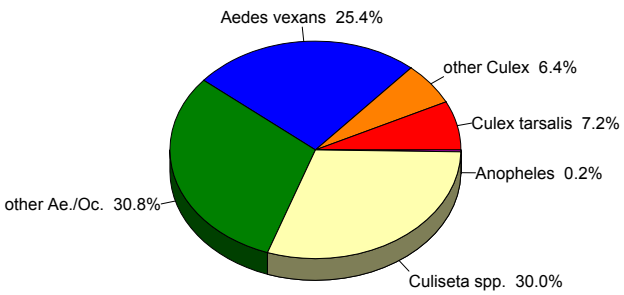
Total number of trap/nights set: 17
Total number of mosquitoes collected: 808
Average mosquitoes per trap/night: 48



Species collected:
Aedes vexans
Ochlerotatus dorsalis
Ochlerotatus melanimon
Ochlerotatus trivittatus
Ochlerotatus increpitus
Ochlerotatus nigromaculis
Anopheles hermsi
Culex tarsalis
Culex pipiens
Culex erythrothorax
Culiseta inornata
Culiseta incidens

Species abundance:

Species	Number	Percent of Total
Aedes vexans	205	25.4%
Other *Aedes/Ochlerotatus*	249	30.8%
Anopheles hermsi	2	0.2%
Culex tarsalis	58	7.2%
Other *Culex*	52	6.4%
Culiseta spp.	242	30.0%



West Nile Virus Testing – No mosquito pools from this trap site tested positive for WNV.

Adulticide Report

Complete History *Beginning Date:* 7/7/2004 *Ending Date:* 9/23/2004

Date	Subdiv/Area	Material	Start Time	End Time	Miles Sprayed
Garfield County Unincorporated					
Truck ULV					
7/22/2004	Rifle Frontage RD	Biomist 3+15	10:15:00 PM	10:22:00 PM	2.0
7/22/2004	Garfield Airport and Rifle Generatin	Biomist 3+15	9:18:00 PM	10:10:00 PM	6.0
7/28/2004	Snyder & GF Road Bridge	Biomist 3+15	8:35:00 PM	9:45:00 PM	16.0
8/13/2004	Silt Mesa	Biomist 3+15	8:30:00 PM	9:24:00 PM	6.0
Summary for 'Equipment' = Truck ULV (4 detail records)					
				Sum	*30.0*
				Avg	*7.5*
				Min	*2.0*
				Max	*16.0*
Parachute, Town of					
Truck ULV					
7/22/2004	Town of Parachute	Biomist 3+15	10:50:00 PM	11:45:00 PM	12.0
8/16/2004	City of Parachute	Biomist 3+15	8:30:00 PM	10:45:00 PM	16.0
8/26/2004	Parachute	Biomist 3+15	8:15:00 PM	9:30:00 PM	10.0
9/3/2004	Parachute	Biomist 3+15	9:00:00 PM	10:00:00 PM	7.0
9/23/2004	Parachute	Biomist 3+15	8:30:00 PM	9:40:00 PM	8.0
Summary for 'Equipment' = Truck ULV (5 detail records)					
				Sum	*53.0*
				Avg	*10.6*
				Min	*7.0*
				Max	*16.0*
Silt, Town of					
Truck ULV					
7/7/2004	Storage Facility	Biomist 3+15	9:11:00 PM	9:32:00 PM	1.0
8/9/2004	Storage Facility	Biomist 3+15	8:50:00 PM	9:10:00 PM	1.0
Summary for 'Equipment' = Truck ULV (2 detail records)					
				Sum	*2.0*
				Avg	*1.0*
				Min	*1.0*
				Max	*1.0*

COLORADO MOSQUITO CONTROL, INC.

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