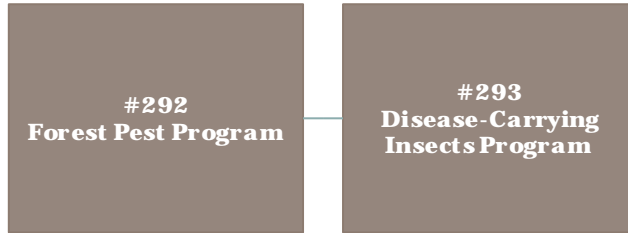


Integrated Pest Management Program



Fund Overview

Fund 40080, Integrated Pest Management Program, includes two separate programs – the Forest Pest Program managed by Stormwater Services and the Disease-Carrying Insects Program managed by the Health Department. Integrated Pest Management (IPM) is an ecological approach to pest control that combines appropriate pest control strategies into a unified, site-specific plan. The goal of an IPM program is to reduce pest numbers to acceptable levels in ways that are practical, cost-effective, and safe for people and the environment.

The Forest Pest Program focuses on preventing the spread of state approved forest insects and diseases in the County. The program is a cooperative program with the United States Department of Agriculture (USDA) Forest Service and the Virginia Department of Agriculture and Consumer Services (VDACS). VDACS maintains a list of insects that are eligible for control by this program. Currently, five insects and two diseases are listed: the gypsy moth, cankerworm, emerald ash borer, hemlock woolly adelgid, Asian long-horned beetle, sudden oak death and thousand cankers disease of black walnut. The proposed treatment plan and resource requirements for these pests are submitted annually to the Board of Supervisors for approval in February.

The Disease-Carrying Insects Program focuses on protecting citizens from public health pests and maintaining a low incidence of the West Nile virus, Lyme disease, and other tick-borne diseases—as the prevention of epidemics and spread of disease is one of the core functions of the Health Department. A wide range of pests threaten public health in Fairfax County because they can transmit pathogens, or their stings or bites can cause reactions. Some of the most common public health pests in Fairfax County include: mosquitoes, house-frequenting insects (e.g. lice, fleas, bed bugs, and cockroaches), ticks, mites, flies, and venomous arthropods (e.g. yellow jackets, hornets, wasps, bees, ants, spiders, centipedes, and urticating caterpillars). The manner in which public health pests are managed depends on the pests that are causing the problems so proper identification is essential. Effective pest management also depends on knowledge of their ecology, biology, and life history. It is critical that pest populations are monitored routinely so that infestations can be detected as early as possible when they are smaller and easier to control.

A countywide tax levy financially supports Fund 40080 activities and this levy is subject to change annually due to funding requirements based on the level of infestation. Since FY 2001, the Board of Supervisors-approved tax rate has been \$0.001 per \$100 assessed value and has provided support for both the Forest Pest and the Disease-Carrying Insects Programs.

Integrated Pest Management Program

Fund Resources

Category	FY 2014 Actual	FY 2015 Actual	FY 2016 Adopted
FUNDING			
Expenditures:			
Compensation	\$822,935	\$860,906	\$1,034,639
Benefits	309,676	342,484	304,441
Operating Expenses	803,262	793,224	1,827,847
Total Expenditures	\$1,935,873	\$1,996,614	\$3,166,927
Transfers Out:			
Transfer Out to General Fund	\$138,000	\$138,000	\$141,000
Total Transfers Out	\$138,000	\$138,000	\$141,000
Revenues:			
General Property Taxes	\$2,048,178	\$2,166,752	\$2,258,159
Interest on Investments	2,850	3,058	7,691
Total Revenue	\$2,051,028	\$2,169,810	\$2,265,850
POSITIONS			
Authorized Positions/Full-Time Equivalents (FTEs)			
Positions:			
Regular	12 / 12	11 / 11	11 / 11
Total Positions	12 / 12	11 / 11	11 / 11

Lines of Business Summary

LOB #	LOB Title	FY 2016 Adopted	
		Disbursements	Positions
292	Forest Pest Program	\$1,196,067	6
293	Disease-Carrying Insects Program	2,111,860	5
Total		\$3,307,927	11

Integrated Pest Management Program

Lines of Business

LOB #292:

FOREST PEST PROGRAM

Purpose

The Fairfax County Forest Integrated Pest Management Program identifies forest insects and diseases within the county that have the potential to cause tree defoliation and tree mortality. Once identified, the Forest Integrated Pest Management Program develops an appropriate management plan to minimize the impacts of the insects or diseases on the county's urban forest resources. The program monitors for various forest insects and diseases as approved by the Virginia Department of Agriculture and Consumer Services. The program is effective because staff has the technical knowledge to manage the forest threats in the most environmentally sound manner as possible, including the spot treatment of outbreak populations of gypsy moth and fall cankerworm caterpillars. During outbreak phases of gypsy moth and fall cankerworm, infestations can be extensive. A government program can treat these large infestations at a cheaper cost than individual homeowners due to economies of scale while using only the most environmentally sound insecticides available. All citizens and businesses in Fairfax County benefit from this program since public and private lands throughout the county are monitored for forest insects and diseases and appropriate management plans are developed as needed. Through citizen outreach and education, organizations, businesses and individual citizens are educated as to the importance of maintaining a healthy urban forest.

Description

In the early 1980s, the Board of Supervisors (BOS) directed urban forest management staff to address the emerging issue of the gypsy moth caterpillar. The mission of this program was to reduce gypsy moth populations to below defoliating levels and to minimize the environmental and economic impacts of the pest by limiting the amount of tree mortality and use of pesticides in the environment. Other forest insects and diseases have emerged and have been added to the program's mission since its inception.

The Forest Pest Program monitors and or manages forest insect pests and diseases as approved by the Virginia Department of Agriculture and Consumer Services.

- Gypsy moth
- Fall cankerworm
- Emerald ash borer
- Hemlock woolly adelgid
- Thousand cankers disease of walnut
- Asian longhorned beetle
- Sudden oak death

The Forest Pest Program provides outreach and education on forest health to:

- School aged children
- Professional education targeting industry and other natural resource professionals
- Civic groups
- County residents

Integrated Pest Management Program

The Forest Pest Program follows the principles of Integrated Pest Management (IPM) and includes:

- An ecological, cost effective approach to pest control
- A desired goal of reducing pest populations to acceptable levels
- Methods that are practical and environmentally sound

The Forest Pest Program provides monitoring and control activities for Forest pests and are:

- Conducted annually to determine pest population levels
- Critical in developing management strategies
- Are based on federal, state and scientific guidance
- The basis for the annual submission to the Fairfax County Board of Supervisors

This LOB is performed with 5/5.0 FTE positions including 1/1.0 FTE Urban Forester III and 4/4.0 FTE Urban Foresters II.

A countywide tax levy financially supports Fund 40080 activities and this levy is subject to change annually due to funding requirements based on the level of infestation. Since FY 2001, the Board of Supervisors-approved tax rate has been \$0.001 per \$100 assessed value and has provided support for both the Forest Pest and the Disease-Carrying Insects Programs.

Benefits

The results of a Forest Pest Program provide multiple benefits to the environment and to the residents of Fairfax County. A healthy urban tree canopy is essential to a healthy ecosystem.

Environmental benefits of a healthy urban forest system include:

- The removal of atmospheric pollutants
- The improvement of water quality
- The prevention of soil erosion and stormwater runoff
- The preservation of native tree species
- Providing habitat for wildlife
- Maintaining a high quality of life for county residents
- Reducing the amount of harmful pesticides used by homeowners

As a branch in the Urban Forest Management Division (UFMD) the Forest Pest Program is aligned with the mission of Stormwater Services as it strives to improve water quality and stormwater management through tree conservation. Tree canopy and forest soils contribute significant levels of water pollution and stormwater runoff mitigation services. Recent analysis has estimated that the County would need to invest \$1.9 billion dollars in infrastructure to match the level of stormwater management that is provided by its tree canopy during a ten-year storm event.

UFMD works directly with other Stormwater Services programs to incorporate urban forest management into regulatory requirements and processes such as Total Maximum Daily Load (TMDL) water quality planning and the Municipal Separate Storm Sewer System permit process.

Integrated Pest Management Program

The UFMD, including the Forest Pest Management Branch, Practices Environmental Stewardship by protecting and encourages the protection of the urban forest and other natural resources of the county, the county's green infrastructure, in order to maximize the environmental, economic and social benefits of these resources, including water quality and quantity management. This is accomplished through partnerships with the development industry, nonprofits, and other county and state agencies; public education; and direct management of urban forest resources, including the monitoring and limited suppression of forest pests.

The Forest Pest Program is responsible for residential, commercial and publically owned land within the County. All citizens benefit from this program since parks and common areas are monitored and maintained. The program relates to the County vision elements by protecting our natural resources, providing a service that is economically sound, and encourages the protection of our natural resources.

Mandates

This Line of Business is not mandated.

Trends and Challenges

Forest insect and disease trends are very difficult to predict in the long term. All insects and many diseases exhibit population cycles. Populations will be high for a period of years, then drop for a period, only to rise again. For example, in the early to mid-1990s, annual treatment requirements for the gypsy moth fluctuated from 3,000 to 45,000 acres. This fluctuation was due to the normal population cycle of the insect and not the control provided by the program. The goal of the program is to suppress the negative effects of the insects and diseases such as defoliation and mortality.

This program was initiated in response the gypsy moth caterpillar. Over time new insects have been added to the program's mission and include:

- Fall Cankerworm which is a native insect that prefers many tree species in the County. Populations for this pest are cyclic and require annual monitoring.
- Emerald ash borer which is an insect introduced from Asia and feeds on all ash (*Fraxinus* spp.). Ash trees are quickly disappearing from the Fairfax County landscape. This insect is lethal to ash trees. Staff has developed a treatment program for county owned trees and an outreach program for homeowners for privately owned trees. Large scale treatment of wild ash stands is not possible for this insect.
- Asian longhorned beetle which is an insect introduced from Asia and feeds on many tree species. This insect is not known to be present in Fairfax County however is has potential to cause serious environmental and economic effects should it be found here. Staff will continue to monitor for this pest and be prepared to act quickly should it be found.
- Hemlock woolly adelgid which is an insect introduced from Asia and feeds on eastern hemlock. Staff monitors native hemlock stands and provides control for this pest when necessary.
- 1000 cankers disease of walnut which is an insect (and a diseased it carries) introduced from the western United States and feeds on walnut trees. This insect has been found to cause walnut mortality in other parts of the United States. Staff has confirmed that his insect is present in the County and is monitoring walnut health.
- Sudden oak death is a disease found in the western USA and has caused widespread oak mortality where is known to exist. Staff is assisting the Virginia Department of Agriculture and Consumer Services in monitoring for this disease and is prepared to act if need be.

It is impossible to predict if and when new insects and diseased will become a problem for the trees of Fairfax County. Diligent monitoring and cooperation with State and Federal agencies is critical in maintaining the natural ecosystem of the County.

Integrated Pest Management Program

Resources

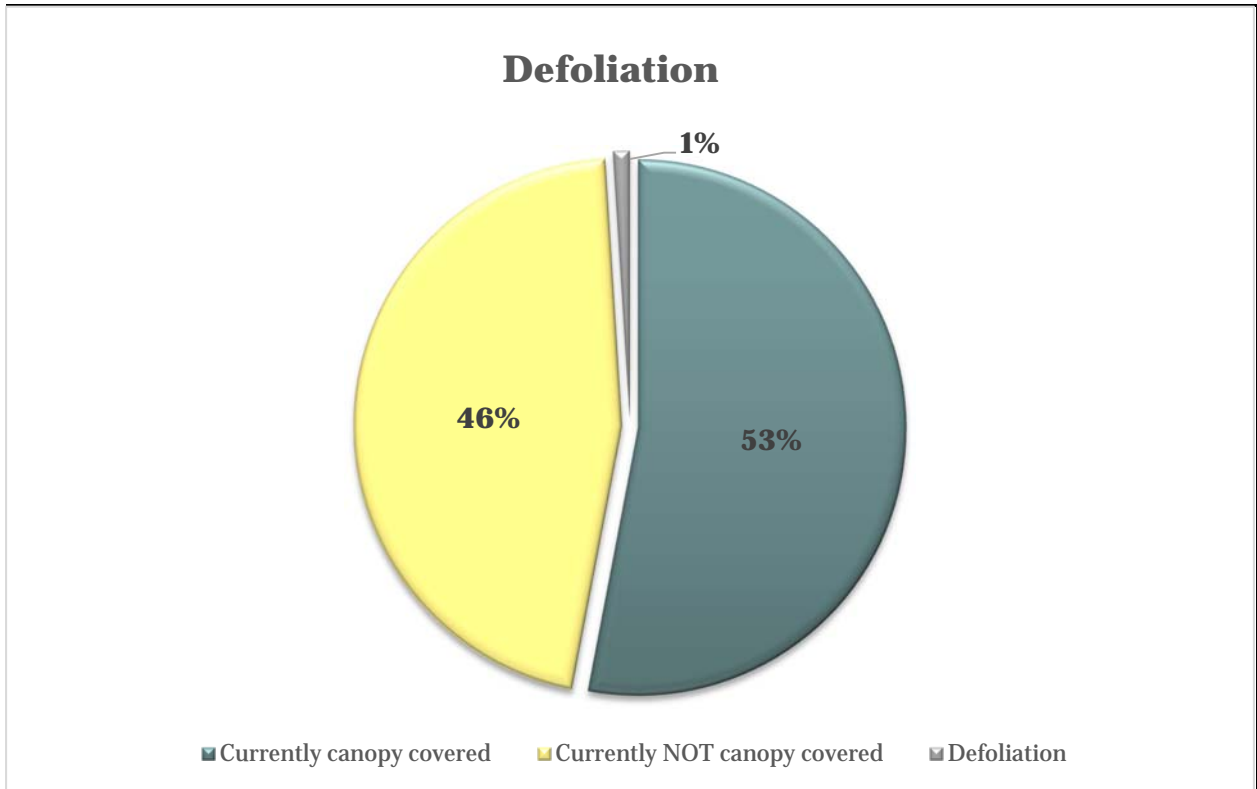
Category	FY 2014 Actual	FY 2015 Actual	FY 2016 Adopted
LOB #292: Forest Pest Program			
FUNDING			
<u>Expenditures:</u>			
Compensation	\$490,006	\$481,316	\$475,246
Benefits	196,367	208,687	154,963
Operating Expenses	146,807	119,220	499,405
Total Expenditures	\$833,180	\$809,223	\$1,129,614
<u>Transfers Out:</u>			
Transfer Out to General Fund	\$65,039	\$65,039	\$66,453
Total Transfers Out	\$65,039	\$65,039	\$66,453
Total Revenue	\$889,941	\$890,476	\$824,187
POSITIONS			
Authorized Positions/Full-Time Equivalents (FTEs)			
<u>Positions:</u>			
Regular	7 / 7	6 / 6	6 / 6
Total Positions	7 / 7	6 / 6	6 / 6

Metrics

Metric Indicator	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Estimate	FY 2017 Estimate
Percent of forest defoliated	1%	1%	< 1%	< 1%	< 1%

Integrated Pest Management Program

The goal of the Forest Pest Program is to suppress the negative effects of insects and diseases such as defoliation. The only true measure of the effectiveness of this program is the amount of defoliation in a particular year. Ideally defoliation should be kept to below 1 percent of the County's total canopy (staff estimates that 53 percent of the County is currently canopy covered).



Integrated Pest Management Program

LOB #293:

DISEASE-CARRYING INSECTS PROGRAM

Purpose

The Health Department's Environmental Health Program utilizes an Integrated Pest Management (IPM) approach and performs vector surveillance activities, control, outreach and education to the public about how to protect against disease carrying insects and vector-borne disease specific to mosquitoes and ticks.

Description

Disease Carrying Insects Program (DCIP)

In order to address the presence of emerging diseases, the County established a multi-agency mosquito surveillance and management committee, and the Health Department secured contract services in 2002 to carry out specialized activities in mosquito surveillance and control. The Health Department also focuses on heightening awareness of tick and tick-borne diseases. Lyme disease is a bacterial infection transmitted to man by the bite of an infected black-legged (deer) tick. Currently the program consists of three major components: surveillance, control, and outreach.

Mosquito surveillance and control activities help protect the public by identifying aquatic habitats that support the development of mosquitoes and, when indicated, treating those habitats with a larvicide. Storm drain and other larvicide treatments are carried out by a contractor. Since the 2004 mosquito surveillance activities have been performed by Health Department staff. Contracted services have been retained for the labor-intensive preemptive control activities that require a significant fleet of vehicles and specialized equipment. The County continues to proactively treat the storm water catch basins in an effort to reduce the population of *Culex* mosquitoes that transmit West Nile virus (WNV). Catch basins are treated from May through October to ensure the aggressive suppression of the WNV vector. Inspection and larviciding activities are carried out in targeted areas of the County identified as significant mosquito breeding areas.

The outreach and education component of the WNV program is aimed at increasing residents' awareness of actions that can be taken for personal protection and reduction of potential mosquito breeding areas on private property. The program produces and distributes outreach material in English, Korean, and Spanish. Outreach and education activities are conducted by Health Department staff with education and experience in the field of Environmental Health.

A countywide tax levy financially supports Fund 40080 activities and this levy is subject to change annually due to funding requirements based on the level of infestation. Since FY 2001, the Board of Supervisors-approved tax rate has been \$0.001 per \$100 assessed value and has provided support for both the Forest Pest and the Disease-Carrying Insects Programs.

Benefits

Environmental Health programs are essential to the protection, improvement, and preservation of public health. A strong surveillance program provides information about the local mosquito vector populations and testing for pathogens like West Nile virus provides information about the presence of pathogens in these populations. This information can be utilized for a variety of public health actions. Vector-borne diseases are preventable and one of the most effective ways prevent them is through the use of personal protective measures which help prevent bites. Education and outreach activities provide opportunities to relay these messages to county residents and to promote healthy behaviors that protect and improve quality of life in the community.

Integrated Pest Management Program

Mandates

This Line of Business is not mandated.

Trends and Challenges

Mosquito vector abundance and annual West Nile virus (WNV) activity are not easily predictable and vary from year-to-year. Long- and short-term environmental conditions as well as timing and availability of susceptible reservoir populations during mosquito season can impact both mosquito and WNV activity. Rainfall can present challenges for control activities and also impacts mosquito abundance.

Chikungunya virus (CHIKV) is a mosquito-borne disease transmitted from person-to-person by the yellow fever mosquito (*Aedes aegypti*) or the Asian tiger mosquito (*Aedes albopictus*). It was first discovered during a small outbreak in east Africa in 1953, but several outbreaks have been reported since 2004 in Africa, Asia, Europe, and islands in the Indian and Pacific Oceans. An epidemic of locally transmitted CHIKV was detected in the Caribbean beginning in December 2013, and is ongoing. This is the first time this virus has been transmitted in the western hemisphere, with more than 1.625 million probable cases reported to date from the Americas. As of September 2015, the Centers for Disease Control and Prevention (CDC) has reported 294 imported cases of CHIKV this year in the U.S. from travelers returning from areas of active transmission. In CY 2015, there has been no local transmission of CHIKV in the United States. If there are locally acquired cases of CHIKV in the County, the Health Department will utilize the guidance document "Preparedness and Response for Chikungunya Virus Introduction in the Americas" published by the CDC and Pan American Health Organization (PAHO). A brochure about CHIKV is currently under development.

The Zika virus, which is transmitted by same mosquitoes that transmit CHIKV, began circulating in South and Central America in 2015. The virus was originally identified in Africa in 1947; outbreaks previously been reported in Africa, Southeast Asia, and the Pacific Islands. Locally-acquired cases have been reported from at least nine countries in Central and South America. The CDC reports that cases have been reported in returning travelers but the virus is not currently found in the United States.

The development, implementation, refinement, and evaluation of action thresholds are key components of IPM. Mosquito and WNV activity, as well as human WNV disease, provide information that can help trigger various public health actions. Quick turn-around of mosquito samples and subsequent testing for WNV and timely follow-ups on possible human cases of WNV are all important for this process.

Warmer temperatures and greater rainfall create the ideal conditions for the spread of vector-borne diseases. Research finds that as temperature and rainfall change, vectors such as ticks and mosquitoes are able to expand their territories and introduce disease risks to new regions. The chance for the introduction of vector-borne diseases and/or vectors into our area is real given the global nature of travel today. It is important to protect public health, be able to identify, adjust, and adapt to these new challenges if they should appear by maintaining surveillance and control capabilities, technical knowledge and expertise, and a strong outreach and educational component.

Integrated Pest Management Program

Resources

Category	FY 2014 Actual	FY 2015 Actual	FY 2016 Adopted
LOB #293: Disease-Carrying Insects Program			
FUNDING			
Expenditures:			
Compensation	\$332,929	\$379,590	\$559,393
Benefits	113,309	133,797	149,478
Operating Expenses	656,455	674,004	1,328,442
Total Expenditures	\$1,102,693	\$1,187,391	\$2,037,313
Transfers Out:			
Transfer Out to General Fund	\$72,961	\$72,961	\$74,547
Total Transfers Out	\$72,961	\$72,961	\$74,547
Total Revenue	\$1,161,087	\$1,279,334	\$1,441,663
POSITIONS			
Authorized Positions/Full-Time Equivalents (FTEs)			
Positions:			
Regular	5 / 5	5 / 5	5 / 5
Total Positions	5 / 5	5 / 5	5 / 5

Metrics

Metric Indicator	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Estimate	FY 2017 Estimate
Mosquito larvicide treatments of storm drains to control West Nile virus	101,013	103,661	76,377	105,000	105,000
Disease-carrying insects program cost per capita	\$1.10	\$1.02	\$1.07	\$1.79	\$1.80
Percent of targeted storm drain areas treated with mosquito larvicide within the scheduled timeframe	91%	94%	70%	100%	100%
Confirmed human cases of West Nile virus in Fairfax County, Fairfax City, and Falls Church City as reported by the Virginia Department of Health	8	3	1	1	1

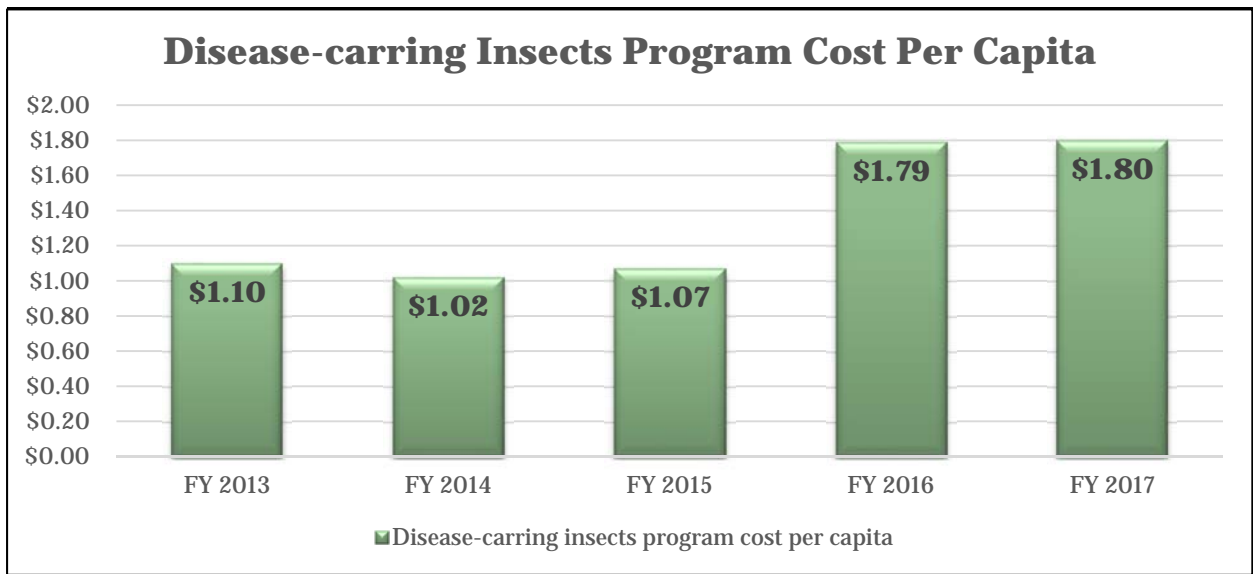
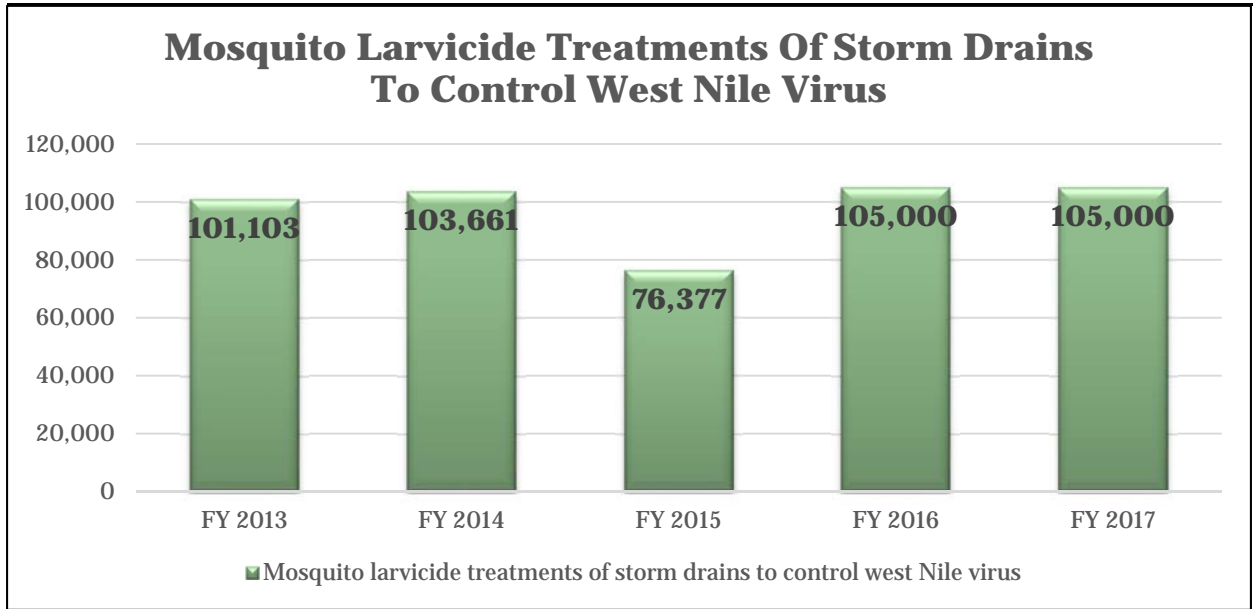
Approximately 35,000 storm drains are treated with a larvicide during three separate six-week cycles from mid-May through October, for a total of approximately 105,000 storm drain treatments. Weather conditions are the principal factors that determine the number of storm drains that will be treated, as well as the percent of storm drains treated within the scheduled timeframe, during a given year. There was a significant decrease in the number of larvicide treatments of storm drains for the control of mosquitoes that transmit West Nile Virus from FY 2014 (103,661) to FY 2015 (76,377). The new contract with the provider of mosquito control services was delayed and not awarded until late May 2015. Multiple days of rainfall in June 2015 limited the application of larvicide treatment.

Disease Carrying Insect Program (DCIP) costs are based on the number and size of treatment rounds in a given year, as well as education, outreach, and surveillance activities carried out in-house. Treatment rounds, although dependent on weather conditions, remain relatively constant throughout the years, maintaining a relatively stable program cost. The total DCIP cost per capita was \$1.07 in FY 2015. This was lower than the budget of \$1.80 per capita. The estimated cost for FY 2016 and FY 2017 provides the capacity

Integrated Pest Management Program

for a higher cost per capita; actual spending will depend on environmental factors, insecticide treatments resulting from larval inspections and surveillance activities, outreach and education costs, and other program activities.

The continuing goal of the DCIP in FY 2016 is to hold the number of human cases of West Nile virus (WNV) as reported by the Virginia Department of Health to no more than one case, the same goal as in prior years. In FY 2015, one human case of WNV was reported.



Integrated Pest Management Program

