OTTER CREEK WATERSHED
INSECT CONTROL DISTRICT (OCW)

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INTEGRATED PEST MANAGEMENT PLAN

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Approved by: OCW Board of Trustees
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General Statement of Policy and Goals

The Otter Creek Watershed Insect Control District (OCW) provides mosquito and biting fly control services for the towns of Brandon, Goshen, Leicester, Pittsford, Proctor, and Salisbury in Vermont. The district was organized in 1978 as a union municipal district in accordance with Title 24 of the Vermont Statutes Annotated § 4861 - 4866 in response to a strongly supported local demand that more be done about the mosquito pest problem in the area.

The six towns that the OCW serves are in the Otter Creek watershed, which is in Rutland and Addison counties. The Otter Creek, at 112-miles, is the longest stream entirely within the borders of Vermont. From headwaters in the towns of Mount Tabor, Peru, and Dorset, the Otter Creek flows north to Lake Champlain.

Active summer resort areas around Lake Dunmore and Fern Lake, very important to the local economy, are in the Otter Creek watershed. Located on Lake Dunmore are Branbury State Park, a Vermont Fish and Wildlife boat launch, Kampersville and Waterhouse campgrounds, and the oldest continuously operated boys' (Camp Keewaydin) and girls' (Camp Songadeewin) summer camps in the United States. This is in addition to the numerous year-round and summer homes that surround both lakes. Obviously, mosquito populations can have a profound effect on enjoyment of the lakes… and outdoor summer activities elsewhere in the district.

The OCW's mission as a union municipal district is to control mosquito and biting fly populations in member towns. Ongoing, effective pest control is critical to maintaining the quality of life that people in this area expect. To accomplish our mission, the OCW uses a variety of methods (referred to as Integrated Pest Management or IPM) in a manner consistent with the highest level of safety and minimal adverse impacts on humans, wildlife, and the environment, including non-target organisms. A concept underlying mosquito control is to intervene when populations are concentrated, immobile, and accessible. Towards that end, IPM strategies incorporate several control measures, such as prevention / cultural methods, mechanical / physical methods, biological control methods, and use of larvicides and adulticides. Most of those control methods are used by the OCW to reduce both mosquito larvae and adults within the district. The OCW's goal is to manage mosquito populations to achieve tolerable levels by employing IPM methods.

The Vermont Agency of Natural Resources Department of Environmental Conservation (ANR DEC) issues a Pesticide General Permit (under the aegis of the U.S. Clean Water Act) that allows the OCW to use larvicides and adulticides in and around the State's waters. That permit, renewed every five years, is supplemented by detailed comprehensive regulations contained in the Vermont Rule for Control of Pesticides that are promulgated by the Vermont Agency of Agriculture, Food and Markets (VAAFM).

The OCW is funded by the taxpayers of the towns in which mosquito and biting fly control operations are being done, by a larvicide program grant from the VAAFM, and by an annual donation from the Lake Dunmore Fern Lake Association. The OCW is governed by a Board of Trustees comprised of two representatives and an alternate representative appointed by each member town's Select Board.

Definitions

Barrier Treatments: adulticide applications designed to remain active for an extended period on surfaces where mosquitoes rest and feed. They generally are applied as a mist or spray directly to plant leaves, turf, mulch, or other surfaces to create a "barrier" around a space.

Integrated Pest Management (IPM): a decision-making process that selects, integrates, and implements a combination of suitable and compatible strategies to prevent, deter, or manage pest populations within established thresholds. IPM uses a "whole systems approach," viewing the target species as it relates to the entire ecosystem. Management strategies are chosen that minimize impacts to human health, the environment, and non-target organisms, and protect overall biodiversity and ecosystem health.

Pest: broadly, a pest is an organism that interferes with or reduces the availability or quality of desirable plants and other resources; impacts human or animal health; damages structures; or harms some component of the ecosystem. Whether or not an organism is considered a pest can depend on the setting, rather than the particular species. A pest may be an insect, rodent, nematode, fungus, weed, or any other form of terrestrial or aquatic plant or animal life or virus, bacteria, or other microorganism (except viruses, bacteria, or other micro-organisms on or living in man or other living animals) which the Administrator of the EPA declares to be a pest under Chapter 7 U.S. Code Annotated § 136w (c) (1).

Pesticide: any substance or mixture of substances intended for use in destroying or repelling any pest. This includes, without limitation, fungicides, insecticides, nematicides, herbicides, and rodenticides. Insecticides include larvicides, used for killing pests when they are in their larval stage of development, and adulticides, used for killing adult pests.

Identification of Species to be Controlled

There are approximately 45 species of mosquitos found in Vermont, with many differences in the details of their life stages, such as their preferred source of blood meal, number of generations in a year, type of preferred breeding habitat, and water temperature requirements for larvae development. Some species emerge in the spring, some in summer, while others are present primarily in the fall. Time required for development from egg to adult also varies from a few days to a few months, depending on the species and environmental conditions. Successful control methods and timing differ according to the species present. While mosquitos may over-winter in the pupal stage or as adults, the egg stage is more usual in Vermont.

The table below lists the 22 species of mosquitoes which were captured in OCW light traps or net sweeps more than 400 times from 2016 to 2022 (listed in order from highest to lowest prevalence), with *Aedes vexans* captured more than 52,000 times and the other species in the top five captured more than 10,000 times. While many of the mosquito species in the table are known vectors for other diseases elsewhere, only arboviruses seen in Addison and Rutland Counties are shown.

Genus & species	**Breeding Habitat**	**Flight Range**	**Bites Humans**	**Disease Vector for**
Aedes vexans	Floodwater pools & wetlands	3 to 5 miles	Yes	Dog heartworm & EEE[1] suspect
Coquillettidia perturbans	Cattail swamps	3 to 5 miles	Yes	Secondary EEE vector
Ochlerotatus sticticus	Temporary woodland pools & floodplains of rivers and large streams	Up to 5 miles	Yes	WNV[2] & EEE
Anopheles punctipennis	Stream and floodwater pools	Less than 1 mile	Yes	Not in the OCW
Ochlerotatus trivittatus	Floodwater & woodland pools	Up to 5 miles	Yes	Secondary EEE vector
Aedes cinereus	Semi-permanent bogs and swamps & woodlands	Less than 1.5 miles	Yes	Not in the OCW
Ochlerotatus stimulans	Woodland pools	Less than 1/2 mile	Yes	Not in the OCW
Anopheles quadrimaculatus	Fresh water streams, ponds, and lakes	Less than 1 mile	Yes	Not in the OCW
Ochlerotatus excrucians	Woodland snowmelt pools	Up to 8 miles	Yes	Dog heartworm
Anopheles walkeri	Fresh water marshes containing emergent or floating vegetation	Up to 3 miles	Yes	Not in the OCW
Ochlerotatus canadensis	Woodland pools, swamp borders and grassy hummock areas	Less than 100 yards	Yes	Primary dog heartworm & EEE suspect
Ochlerotatus intrudens	Temporary and semi-permanent woodland pools, marshes, bogs, and grassy drainage ditches	Up to 8 miles	Yes	WNV
Ochlerotatus punctor	Temporary pools and sphagnum bogs in densely wooded forests	Up to 8 miles	Yes	Not in the OCW
Culex pipiens	Any type of water	Less than 1 mile	Yes	Primary WNV vector
Uranotaenia sapphirina	Permanent and semi-permanent swamps	Less than 5 miles	No	Not in the OCW

Genus & species	**Breeding Habitat**	**Flight Range**	**Bites Humans**	**Disease Vector for**
Ochlerotatus japonicus	Rock pools & containers such as tires	Up to 8 miles	Yes	Not in the OCW
Culex restuans	Temporary ground pools that remain flooded after they have produced broods of *Aedes*	Up to 2 miles	Yes	Secondary WNV vector
Culex salinarius	Grassy pools, ditches, and ponds	Less than 1 mile	Yes	Secondary WNV vector
Anopheles barberi	Tree holes; larvae are predators of other mosquito larvae	Up to 3 miles	Yes	Not in the OCW
Ochlerotatus triseriatus	Tree-holes, tires, and other artificial containers	Less than 1000 feet	Yes	Not in the OCW
Culiseta melanura	Acidic ground water habitats, including swamps, flood plains, and pools	Up to 2 miles	Yes	Primary EEE vector
Psorophora ferox	Woodlands	Up to 2 miles	Yes	None

[1] Eastern Equine Encephalitis
[2] West Nile Virus

Larval Control Threshold

The action threshold for controlling mosquito larvae is established by the VAAFM Public Health & Agricultural Resource Division (PHARM). The action threshold is: ten (10) or more mosquito larvae are collected, on average, in ten (10) sampling dips taken at least ten (10) feet apart using a standard dipper cup.

Adult Control Thresholds

The action thresholds for controlling adult mosquito and biting fly pests were established by the OCW Board of Trustees based on historical data and scientific studies seeking to define the level of mosquito activity that humans find to be a “nuisance”. The action thresholds are: fifteen (15) or more biting flies and/or adult mosquitoes which are known to bite humans captured in a net sweep or forty (40) or more captured in a United States Centers for Disease Control and Prevention (CDC) light trap for every 24 hours that the trap is set.

In addition, if the Vermont Department of Health (VTDOH) declares a public health emergency due to mosquito vector disease, control actions may be conducted in a particular area until the VTDOH determines that the disease threat has been abated.

CDC light traps are used to monitor adult mosquito populations. There is at least one trap site along each of the adulticide spray routes that the OCW services. Trap locations are selected based on their proximity to historic breeding areas and are placed out of direct sunlight, in areas with dense vegetation, and where birds are known to nest.

Traps are powered by 6-volt batteries which run a small light and a fan. A pheromone pellet is placed in the trap. The traps are connected to a small carbon dioxide (CO^2) tank, since that gas is a primary attractant to female mosquitoes. The female mosquitoes are attracted to the top of the trap by the CO^2 , the light, and the pheromones, where the fan draws them into the catch bag. Traps run throughout the night collecting adult mosquitos. The traps are retrieved the next day and taken to the OCW's facility for examination. That same day the trap contents are frozen and counted. Since 99.5 percent of mosquitoes being captured by the OCW are known to bite humans, the trap / net counts are used to make treatment decisions. Within the same week a sample of mosquitos are identified under a microscope by genus and species to identify population composition and trends. The collection record is annotated with count and identification results.

Larval Control Options

Control of mosquitoes is most effective when they are in the larval stage. At this stage of development, the insect is confined to water and lacks the winged mobility that offers the adult a means of escape. When larva control efforts are timed just right, large populations can be decimated, thus significantly reducing the number of adults that will become a human pest. Larviciding is a key component to any integrated mosquito management program.

While larviciding can be very effective, other control options are available and employed by the OCW as part of our IPM. The following tables summarize the water quality impacts, non-target organism impacts, feasibility, cost effectiveness, and previous management measures of all larvae control methods used by the OCW.

Larvae – Prevention / Cultural Methods

Water Quality Impact	None
Non-target Organism Impact	None

Larvae – Prevention / Cultural Methods (continued)

Feasibility	Feasible and encouraged via the OCW's public relations efforts and direct interaction with property owners. Through newspaper / newsletter articles, brochures prepared and distributed by the OCW's Board and volunteers, and the OCW website, the public is encouraged to minimize mosquito breeding habitat by, among many other things, emptying containers and other repositories that collect stagnant water. Landowners are encouraged to manage emergent vegetation and maintain ditches / natural drains to minimize flooded areas which are prime mosquito habitat.
Cost Effectiveness	Low to moderate. While the OCW's public relations efforts have led to good, helpful actions by residents to reduce breeding habitats, ultimately these efforts are not very effective given the 16,000+ acres of Class 2 wetlands in the area the OCW services compared to the small breeding areas (e.g., old tires, bird baths, wading pools, gutters, boat covers) that can be emptied of stagnant water by the public. More effective are efforts by property owners to keep ditches and natural drains open and flowing, particularly in the spring when substantial field flooding occurs.
Previous Management Measures	Encouraging property owners to minimize stagnant water mosquito breeding habitat has been done for over a decade.

Larvae – Mechanical / Physical Methods

Water Quality Impact	None
Non-target Organism Impact	None known as the physical methods the OCW employs just return flooded areas to their pre-existing natural condition.
Feasibility	Feasible. Mosquitoes need stagnant water to complete their life cycle. Restoring drainage systems to historic conditions allows the free flow of water, drastically reducing mosquito larva development. OCW employees remove debris from roadside culverts when found during surveillance activities. They also report flooded ditches and plugged culverts to town road foremen, encouraging them to keep those ditches free of standing water and to unclog culverts, using heavy equipment where needed, to allow flooded areas to drain. When that encouragement is ineffective, the OCW Board of Trustees Chair contacts the Town Manager or Select Board Chair to spur appropriate action.
Cost Effectiveness	Very cost effective. Opening drainage helps to minimize flooded areas which are prime mosquito breeding habitat.
Previous Management Measures	OCW staff action and encouraging town efforts to keep drainage ditches and culverts open has been done for over a decade. Concerns about adverse impacts to wildlife habitat sometimes results in no action being taken.

Larvae – Biological Control Methods

Water Quality Impact	None
Non-target Organism Impact	None
Feasibility	The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) has been attempting to use this method in Wildlife Management Areas and Wetlands Reserve properties that they have created within the district. The OCW's subjective experience is that several years elapse before natural predators (e.g., dragonfly larvae and fish) become established well enough to be effective as mosquito larvae controls.
Cost Effectiveness	This method is under the control of the USDA NRCS and private landowners who bear the costs, if any. Also, most of the district's wetlands are located on privately-owned property and those NRCS management areas cover relatively little of that acreage. Possibly these biological control methods will become more well-established and, consequently, more effective in the future. That would result in reduced larvae counts and consequent need for larvicide treatments.
Previous Management Measures	The USDA NRCS Wildlife Management Area and Wetlands Reserve programs.

Larvae – Larvicides

Water Quality Impact	Low. When the methods discussed above are infeasible or ineffective, the OCW uses two biological larvicides: Bacillus thuringiensis var. israelensis (Bti) (brand name: VectoBac) and, in areas where there is significant organic pollution, Bacillus sphaericus (BS) (brand name: Spheratax). The OCW also uses Methoprene (brand name: Altosid) in storm drains, similar areas, and locations that need additional treatment, such as pools that remain wet for long periods of time. All larvicides used by the OCW are applied in accordance with label instructions, which have been registered by both the U.S. Environmental Protection Agency (EPA) and by the VAAFM Public Health & Agricultural Resource Management Division (PHARM).

Larvae – Larvicides (continued)

Non-target Organism Impact	Low. All larvicides used by the OCW are applied in accordance with label instructions, which are created by manufacturers and then registered by both the EPA and the VAAFM PHARM, with the intent to protect bystanders, application personnel, and the environment. The label also provides instructions about how to handle and use the product safely. The EPA and VAAFM PHARM have determined that these larvicides are unlikely to cause adverse impacts to non-target organisms when used in accordance with approved product labels. Both Spheratax and Vectobac are approved for use by the Northeast Organic Farmers Association (NOFA) for use on organic farms since they are formulated with organically grown corn.
Feasibility	Feasible. Bti , BS, and Methoprene are very effective in killing mosquito larvae and application is relatively straight forward. Methoprene comes in both liquid and pellet forms; the pesticide applicator selects which form to use depending on the specific treatment situation. BTi and BS are granular products typically applied with a backpack sprayer either operated along shorelines or deployed on the OCW's all-terrain amphibious vehicle (Argo). However, approximately 30% of the district's wetlands are not accessible via Argo due to thick brush. Aerial application of BTi and BS from helicopters is available from a company located on Long Island, New York. That company charges a minimum of $30,000 to provide service in Vermont. About 9% of the mosquitoes captured in OCW light traps are woodland breeders, i.e., not located in areas accessible to larvicide control.
Cost Effectiveness	Larvicides are extremely effective, especially to the extent that eliminating larvae reduces the need to control adult mosquitoes. However, aerial application costs $40+ per acre (which includes the rental cost of the helicopter plus use of the lowest cost, i.e., least persistent, larvicide). At this cost, a one-time aerial larvicide treatment of the district's 16,000 acres of wetlands would consume over 2½ times the entire OCW annual budget. Larvicide application via backpack sprayer, while less expensive than via helicopter, still costs $25 or more per acre (labor plus product), is dependent on terrain accessibility, and is severely limited by labor constraints.
Previous Management Measures	The OCW's larviciding program has been in effect since at least 2006. Over last four years, the average number of acres treated with larvicides using a backpack sprayer was 330 acres. The last aerial larvicide application was in 2018.

Adult Mosquito Control Options

Even the best larvae control program will not prevent some adult mosquitoes from emerging. Mosquitoes' long-term survival strategy is for enough adults to emerge all at once (referred to as a "hatch") that they overwhelm any predators, which is when they then become a human pest. In the Otter Creek Watershed, larvae control is hampered by several factors: (1) the wetland areas potentially requiring treatment are vast compared to the staff, equipment, and fiscal resources available, (2) dense brush is present in about 30% of those wetland areas, making access from the surface virtually impossible, and (3) there are extensive mosquito breeding forested areas throughout the watershed in which larvae control simply is not feasible. While forest breeding areas contribute to the mosquito pest problem, they usually are not the primary source in most cases. Consequently, reducing the adult population to tolerable levels is a prime focus of the OCW's mission.

Adults – Prevention / Cultural Methods

Water Quality Impact	None
Non-target Organism Impact	None
Feasibility	Feasible with respect to minimizing bites and nuisance. However, this method does not affect the actual number of adult biting insects. Through newspaper / newsletter articles, brochures prepared and distributed by the OCW, and the OCW's website, the general public is encouraged, among other actions, to (1) wear long-sleeve light colored shirts and long pants during peak mosquito and biting fly season, (2) limit outdoor activities when mosquitoes are most active, (3) keep window / door screes in good repair, and (4) use repellants that have been registered with the EPA, indicating that they pose minimal risk to human health when used in accordance with product labels.
Cost Effectiveness	Cost effective in that public relations materials and presentations are relatively inexpensive. However, public outreach does not affect, manage, or control the actual number of biting insects, so the OCW still incurs potentially significant larva and adult treatment costs.
Previous Management Measures	Encouraging individuals to protect themselves from biting insects has been done annually via newsletters, news articles, brochures, and the OCW's website.

Adults – Mechanical / Physical Methods

Water Quality Impact	None
Non-target Organism Impact	Minimal. There is some incidental by-catch of moths, flies, and gnats who venture into Centers for Disease Control and Prevention (CDC) light-traps deployed for surveillance of adult biting fly populations.
Feasibility	Very low. The OCW captures thousands of adult mosquitoes in CDC light traps and via net sweeps each season, which has an insignificant impact on the population.
Cost Effectiveness	Not cost effective due to minute impact.
Previous Management Measures	The OCW has been capturing adult mosquitoes in CDC light traps and via net sweeps for decades.

Adults – Biological Control Methods

Water Quality Impact	None
Non-target Organism Impact	None
Feasibility	Not feasible. The OCW has no control over, nor can it increase the numbers of, biting insect predators. According to the American Mosquito Control Association (AMCA) Best Practices for Integrated Mosquito Management (2021) bats, birds, and dragonfly nymphs are not effective components of a mosquito control program.
Cost Effectiveness	Not cost effective due to non-feasibility.
Previous Management Measures	None. See the Non-Target Organism Impact paragraph in the Adults – Adulticides section below for steps that the OCW takes to keep our operations from adversely affecting biting insect predators.

Adults – Adulticides

Water Quality Impact	Low. When the methods discussed above are infeasible or ineffective, the OCW uses permethrin-family (brand name: PermaSease) and malathion-family (brand name: Fyfanon) adulticides that are dispensed from ultra-low volume (ULV) truck-mounted sprayers. ULV sprayers produce extremely small droplet aerosols designed to target adult mosquito wings. Degradation of these small droplets is rapid, leaving little or no residue at ground level in the area being sprayed. The OCW's ULV sprayers are calibrated before the start of each season to ensure that spray droplet sizes are within the approved ranges established by each adulticide's EPA-accepted label. All adulticides used by the OCW are applied in accordance with the product labels, which are created by manufacturers and then registered by both the EPA and the VAAFM PHARM, with the intent to protect bystanders, application personnel, and the environment. The label also provides instructions about how to handle and use the product safely.
Non-target Organism Impact	Low. To protect non-target organisms the OCW only sprays at dusk and after dark, i.e., when bees have stopped foraging and other beneficial insects are sequestered for the night. Based on insect trapping data and human population densities, the OCW has established sixteen (16) spray routes in the towns being serviced. The OCW also has established protocols and advertises that <u>any</u> owner can request a no spray zone for their property. Proper weather conditions are necessary for safe and effective treatment: wind speed cannot exceed ten (10) miles per hour and air temperature must be above fifty (50) degrees Fahrenheit. Also, because adulticide application is ineffective in the rain due to spray dilution, the likelihood of rain must be low at the scheduled time of treatment. Pesticide applicators remain aware of wind direction to minimize having sprayed adulticide drift into an established no spray zone. Based on the OCW's best evidence, no aquatic organisms ever have been adversely affected by the OCW's adulticide use. The OCW has no evidence that our operations are likely to result in a "take" of any species listed as threatened or endangered nor that our operations adversely impact designated endangered or threatened species critical habitat.

Adults – Adulticides (continued)

Feasibility	Feasible. Prior to authorizing the application of adulticide, the OCW District Coordinator considers the following, among other factors: (1) adulticide efficacy against the target biting insect species, (2) any known adulticide resistance, (3) label requirements, (4) availability of the adulticide and application equipment, (5) environmental conditions (current and forecast), (6) cost, and (7) toxicity to non-target species, including humans. Spraying of adulticides only occurs when target insects are present in numbers greater than the established action threshold and only in proper weather conditions. Controlling weather parameters are temperature, wind direction, wind speed, and low likelihood of rain in the forecast.
Cost Effectiveness	Very cost effective. The OCW's actual cost for adulticide application is less than $1.00 per acre, which includes labor, product, and truck expenses, i.e., fuel, maintenance, and insurance. That is far less than the cost of larvicide treatment. The adulticides applied by the OCW to control adult biting insects are used in rotation to maintain their effectiveness, i.e., to minimize developing mosquito resistance. Resistance testing is done annually by sending live samples to the Northeast Regional Center for Excellence in Vector-Borne Diseases Pesticide Resistance Monitoring Program laboratory at Cornell University (or to whichever laboratory is under contract to the CDC to provide that testing).
Previous Management Measures	Adulticides to control adult biting insects have been used in the district since at least the 1970's. The OCW uses adulticides from two chemical families: permethrin and malathion. Permethrin, first registered for use by the EPA in 1979, is a pyrethroid-class synthetic chemical insecticide. Permethrin is used for everything from backyard insect control to termite eradication. Malathion is an organophosphate-class insecticide. Malathion is registered by the EPA and VAAFM for use as a mosquito adulticide.

Inventory of Mosquito Breeding Habitat

Springtime in Vermont usually coincides with large amounts of snowmelt run-off and rainfall which end up in Otter Creek. When the creek gets full, tributaries also fill with water, eventually flooding fields and other low-lying land. Flooded ditches and fields in the Otter Creek watershed provide ideal habitat for mosquito larvae. The water temperature is usually mild, there is plenty of food, and many of the areas prone to flooding are agricultural land, meaning that they remain relatively undisturbed until they dry out. In addition to seasonally flooded fields, spread

throughout the district are over 16,000 acres of Class 2 wetlands and extensive forested areas, all of which are mosquito breeding habitat.

Mechanisms to Reduce Breeding Habitat

The OCW has no control over the mosquito breeding habitat in the district as we own none of those lands. Through newspaper / newsletter articles, brochures prepared and distributed by the OCW, and the OCW's website, the public is encouraged to eliminate stagnant water on their property that collects in bird baths, old tires, etc. While the OCW encourages town public works departments and landowners to keep ditches and culverts open and remove beaver dams, even those efforts sometimes result in pushback that doing so might negatively affect wildlife habitat.

Public Notification Action Plan

Community engagement is a continual, ever-evolving process where a mosquito control program routinely interacts with the public to create trust, increase knowledge, build relationships, understand citizen perceptions and behaviors, and recruit citizen participation. OCW employees, on almost a daily basis during the "season" (May through September), engage with citizens in towns being served. Interactions include seeking landowner permission to place surveillance traps, working with organic farmers to define what control efforts they do, or do not, want on or around their crops, establishing No Spray Zones, responding to requests for service or, while out doing surveillance, just saying "hi" to folks out walking their dogs. The OCW Board of Trustees Chair or Operations Coordinator always promptly follows up on the rare complaints. When invited to do so, OCW employees attend "town days" festivals and the annual Lake Dunmore Fern Lake Association picnic to showcase our equipment and educate people and answer their questions about mosquitoes, their lifecycle, OCW operations, and what the public can do to help reduce the nuisance those pests create. In addition, the Board of Trustees Chair and town representatives regularly attend Select Board meetings to get feedback on satisfaction with OCW control efforts.

Educating the public through the OCW website and a widely distributed pamphlet which emphasizes reducing stagnant water that sits in old tires, boats, gutters, etc. helps with source reduction. Since hundreds of larvae can live in a cup of water, getting rid of a few gallons in old tires can potentially kill thousands of mosquito larva. The amount of breeding habitat that can be eliminated by such public actions is minute compared to the overall district total. However, every bit helps, particularly when the stagnant water is near where people live or work.

Annually, on or about March 15th, the OCW submits the Public Notice of Intent found on the next two pages for publishing in the Addison Independent, the Rutland Herard, and The [Brandon] Reporter, the three newspapers which cover events in Addison and Rutland counties where the OCW operates. A copy is sent to all Town Clerks for posting at each town office. This notice also is posted to the Front Porch Forum websites which residents in the district can access. There are individual Front Porch Forum "communities" (websites) for Salisbury / Leicester / Goshen, Brandon, Pittsford, and Proctor.

In addition, WVTK, a local radio station, includes this notice as part of their public service broadcasts. A summary of the past year's larviciding and adulticiding applications and the No Spray Zone (opt out) policy and procedures are included in the OCW's end of year report sent to each member town. That end of year report subsequently is published in each town's Annual Report, which is mailed to all taxpayers in February and posted on each town's website.

PUBLIC NOTICE OF INTENT TO APPLY MOSQUITO LARVICIDES

On or after April 15th, 20xx, the Otter Creek Watershed Insect Control District (OCW) will be applying ground and possibly aerial treatments of mosquito larvicides on surface waters in the towns of Brandon, Goshen, Leicester, Pittsford, Proctor, and Salisbury to control mosquito larvae populations. Those treatments will use Bacillus thuringiensis israelensis (Bti), Bacillus sphaericus (BS), and Spinosad, which are bacterially derived larvicides. Ground applications of Cocobear (mineral oil) and Methoprene may also be used in selected wet areas to target mosquito pupae and prevent adult emergence.

Exclusion requests need to be renewed annually. Please send a written request to the OCW mail or email address below.

In accordance with paragraph 6.06 (a) of the Vermont Rule for the Control of Pesticides, the OCW has obtained a permit to conduct larvicide applications from the Secretary, Vermont Agency of Agriculture, Food, and Markets.

Further information can be obtained from:

Doug Perkins, OCW Board of Trustees Chair or
Will Mathis, OCW Operations Coordinator
Otter Creek Watershed Insect Control District
P.O. Box 188
Brandon, VT 05733
(802) 247-6779
ocwicd@gmail.com
https://ocwicd.com

Comments or complaints about OCW larvicide operations should be addressed to:

Director, Public Health & Agricultural Resource Management Division
Vermont Agency of Agriculture, Food, and Markets
116 State Street
Montpelier, VT 05620-2901
(802) 522-6973
Steve.dwinell@vermont.gov

PUBLIC NOTICE OF INTENT TO APPLY MOSQUITO ADULTICIDES

On or after May 1st, 20xx, the Otter Creek Watershed Insect Control District (OCW) may be making ground applications of adulticides along the public and private roads in the towns of Brandon, Goshen, Leicester, Pittsford, Proctor, and Salisbury to control adult mosquito populations. Applications of PermaSease 4-4 (a synthetic pyrethroid insecticide) and Fyfanon (in the malathion family) will be made with ultra-low volume truck-mounted sprayers. Zenivex E-4 RTU (a non-ester pyrethroid) may be substituted for PermaSease 4-4 or Fyfanon. Spray routes can be viewed at: https://ocwicd.com/route-maps. At least six hours in advance of spraying, specific route information will be posted to https://ocwicd.com/public-notice.

The OCW call center phone number is (802) 247-6779; the call center will take requests for treatment during the season.

If you wish to opt out of all adult mosquito treatment and not have the road(s) abutting your property sprayed, please send a written request to the OCW. If you submitted an opt out (No Spray Zone) request for your property last year AND there have been no changes in ownership, contact information, or property boundaries, an email to the OCW containing your 911 address and requesting No Spray Zone status again this year will suffice. If you did not submit an opt out request last year and/or there have been changes in ownership, contact information, or property boundaries, please send a letter listing the name(s) of the property owner(s), his/her/their contact telephone numbers, the 911 address of the property, and a property map which clearly shows the property boundaries along the public right of way. Property maps can be obtained from Town Clerks or online at https://maps.vcgi.vermont.gov/ParcelViewer. Upon receipt of your request an OCW employee will contact you and then will mark your property as a No Spray Zone. Opt out requests must be renewed annually.

In accordance with paragraph 6.07 (a) of the Vermont Rule for the Control of Pesticides, the OCW has obtained a permit to conduct truck-mounted mosquito adulticide applications from the Secretary, Vermont Agency of Agriculture, Food, and Markets.

Further information can be obtained from:

Doug Perkins, OCW Board of Trustees Chair or
Will Mathis, OCW Operations Coordinator
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Director, Public Health & Agricultural Resource Management Division
Vermont Agency of Agriculture, Food, and Markets
116 State Street
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(802) 522-6973
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Standards and Practices

Endangered Species Protection

There are 37 state-endangered and 16 state-threatened animals in Vermont. Pertinent to control of adult mosquitoes, those species include the Eastern Small-footed Bat (*Myotis leibii*), Little Brown Bat (*Myotis lucifugus*), Northern Long-eared Bat (*Myotis septentrionalis*), Indiana Bat (*Myotis sodalist*), and the Tri-colored Bat (*Perimyotis subflavus*). There is a well-known bat hibernaculum in an abandoned silver mine in Brandon. The area within 125 yards (less than 1/10th mile) of that hibernaculum has been designated as critical habitat, in which certain forestry activities are prohibited. Birch Hill Road is part of the Brandon SE adulticide spray route, but that road goes no closer than ½ mile to the hibernaculum. Except for Proctor, all towns in which the OCW conducts mosquito control operations are in the summer range of the Indiana Bat. Neither the EPA-registered label for PermaSease 4-4 (the adult mosquito control pyrethrin-family adulticide used by the OCW) nor for Fyfanon (the adult mosquito control malathion-family adulticide used by the OCW) have any restrictions on use of those products where bats are present. The OCW has never had any evidence that adult control of mosquitoes has had any adverse effects on the endangered / threatened species resident in the district. Map(s) of endangered species habitat within the district are in Appendix A.

Water Protection

Pesticide General Permit (PGP) 3807-PGP was issued to the OCW on 11 October 2022 by the Vermont Department of Environmental Conservation Lakes and Ponds Management and Protection Program, acting under the aegis of the U.S. Clean Waters Act National Pollution Discharge Elimination System. The PGP authorizes the OCW to discharge pesticides to the waters of the State.

Both PermaSease 4-4 and Fyfanon are toxic to aquatic organisms, including fish and aquatic invertebrates. Per the EPA-approved label for both products, runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish and aquatic invertebrates. Application of those products over bodies of water (lakes, rivers, permanent streams, natural ponds, commercial fishponds, swamps, marshes, or estuaries), is prohibited **except** when necessary to target areas where adult mosquitoes are present, and weather conditions will facilitate movement of applied material away from the water in order to minimize incidental deposition into the water body.

Wildlife Protection, including Pollinators

Minimizing non-target species adulticide exposure is a high priority for the OCW. Pollinators, mainly insects such as bees, butterflies, wasps, and flies, are essential for the survival of most flowering plants and are necessary for growing more than 50 major crops. Biting insect control is important due to the nuisance they cause and their potential for being vectors for severe human disease.

To control flying adult mosquitos the OCW uses truck mounted Ultra Low Volume (ULV) sprayers. Annually those ULV sprayers are tested to ensure that they are properly calibrated and produce a fog that meets the (EPA-accepted) pesticide manufacturer's specifications for spray rate and a droplet size volume median diameter of < 30 microns with 90% of droplets < 50 microns. At this small size the droplet is designed to impact mosquito sized insects, not other wildlife, or much larger insects such as butterflies, bees, or beetles. Also, the chemical formulations the OCW uses are contact insecticides, selected because those chemicals, once released, break down rapidly, before bees and other wildlife begin to forage the next morning. The spray plume is narrow, typically 300 feet wide (150 feet either side of the truck) but depends on wind direction and speed.

There is a great deal of agriculture in the district, with twenty (20) known apiary operations. ULV aerosol sprays, as opposed to barrier treatments, do not leave residues that might affect pollinators. While the OCW does do barrier treatments upon request from landowners adjacent to No Spray Zones, care is taken to avoid spraying blossoming foliage attractive to pollinators. To further protect apiary interests, the OCW has established No Spray Zones around each operation. (See the Buffer Establishment and Maintenance section below.)

To protect honeybee colonies and other pollinators from possible pesticide exposure, there must be effective communication and cooperation between beekeepers and the insect control district. The OCW realizes that at times controlling adult mosquitoes in areas known to have bee colonies may be necessary. Because bees and other pollinators are most active between sunrise and sunset, the OCW adult mosquito treatment schedule does not begin until after sunset – well after when most bees have returned to their hives. Note also that a significant portion of OCW operations are for control of mosquito larva. Larvicide is applied directly to standing water and therefore does not affect pollinators at all.

OCW employees encourage beekeepers to:
- Locate hives 300 or more feet from roads that will be treated.
- Before April 15th annually, request No Spray Zone status due to the presence of bees.
- Report any colony movement (changes in location) by calling (802) 247-6779 or emailing ocwicd@gmail.com.
- Keep their colonies healthy; healthy hives are less susceptible to disease or damage from pesticides.

The OCW:
- After receiving a No Spray Zone request, marks the property with special stakes that alert pesticide applicators that they are approaching an apiary.
- Pesticide applicators turn off the truck sprayer before reaching the specially marked stake and leave the sprayer off until past the marker stake at the other end of the No Spray Zone.
- At least six hours in advance of spraying, posts on the OCW website Public Notice tab the route(s) to be sprayed and the adulticide(s) to be used.
- All truck mounted spraying is done when bees are not flying, i.e., sunset to sunrise.
- Pesticide applicators monitor wind direction to prevent unwanted spray drift towards colonies.

Buffer Establishment and Maintenance

As a service provider, the OCW must balance the desires of those who want adult mosquito pests controlled in the vicinity of their property with the desires of those people who do not want pesticides used on or near their property. To accommodate those conflicting desires, the OCW has established and widely publicized a No Spray Zone policy, to wit:

1. All No Spray Zone requests must be submitted in writing. No Spray Zone requests must be renewed annually before April 15th. Requests received after April 15th will be honored, but there could be a delay between receipt of the request and marking the property, which could result in the property being sprayed.

2. If a No Spray Zone request was submitted for the preceding year AND there have been no changes in ownership, contact information, or property boundaries, an email to the OCW containing the 911 address and requesting No Spray Zone status again for the current year will suffice. The OCW email address is: ocwicd@gmail.com.

3. If a No Spray Zone request was NOT submitted for the preceding year and/or there have been changes in ownership, contact information, or property boundaries, a letter must be submitted listing the name(s) of the property owner(s), his/her/their contact telephone numbers, the 911 address of the property, and include a property map which clearly shows the property boundaries along the public or private road(s). The OCW mailing address is:

   P.O. Box 188
   Brandon, VT 05733

4. Landowners who are members of the National Organic Farmers Association (NOFA) must submit full documentation each year. This is a NOFA requirement.

5. Upon receipt of a No Spray Zone request an OCW employee will contact the property owner(s) and then will mark the property with stakes to delineate the No Spray Zone.

6. No Spray Zone marker stakes will be placed at the property corners on the right of way unless the adjacent property owner(s) accedes to creating a buffer zone. Landowner(s) wanting a buffer zone for his/her/their property are responsible for obtaining permission, in writing, from their abutters. Such permission must clearly state where along the right of way the No Spray Zone marker stakes are to be placed.

7. No written request, no map, no stakes, then the property gets sprayed.

8. Reflective tape on the top of No Spray Zone marker stakes will indicate to the pesticide applicator:

   Red = stop spraying as soon as the marker is seen

   Green = start spraying after the marker is passed

   Yellow and Black = bees ahead; stop spraying as soon as the marker is seen

   Red and White = end of the spray route / town line; stop spraying as the marker is passed

Appendix A: Map of Threatened / Endangered Species Habitat