



**CITY OF PRINCE GEORGE  
OPERATIONS DEPARTMENT  
Parks & Solid Waste Services Division**

# **PEST MANAGEMENT PLAN**

**Confirmation # 567-0009 16/21**

## **NUISANCE MOSQUITO CONTROL MANAGEMENT PLAN**

City of Prince George  
1100 Patricia Blvd  
Prince George, BC V2L 3V9

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# 1. Introduction

The goal of the City of Prince George nuisance mosquito control program is to reduce mosquito populations to a tolerable level. In areas adjacent to extensive larval development habitat, mosquito populations can become extremely high. When this happens, quality of life for residents in the area can decrease because of severely limited outdoor activity. Further, high numbers of mosquitoes can cause allergic reactions in some individuals, and can also impact tourism.

The City of Prince George has conducted a nuisance mosquito control program since 1986. The program is based on the principals of Integrated Pest Management (IPM), in that the most environmentally sensitive methods of control are considered first. Prevention and reduction of mosquito larval development sites is the first objective of the City of Prince George program, as preventing a problem is always better than trying to control the program once it occurs. However, in reality, there are few instances in which habitat prevention is possible and therefore the vast majority of the City of Prince George mosquito control campaign is focused on controlling mosquitoes while they are in their larval stages, (as opposed to their adult stage) for two primary reasons. Firstly, larval control is much more efficient than adulticiding – it is possible to treat larval mosquitoes in very high concentrations in larval development ponds, while adult mosquitoes tend to disperse over a much wider area soon after emerging. Secondly, larvicides such as Aquabac, Vectobac, Altosid and VectoLex are species specific, affecting only aquatic members of the Order Diptera, which includes mosquitoes, black flies and midges. These larvicides do not impact non-pest and beneficial insects such as pollinators and predators.

The City of Prince George has not included adulticiding in their plan for the management of nuisance mosquitoes. In the unlikely event of a West Nile Virus outbreak, and under the Order of a Medical Health Officer, the City may be required, under the Health Act, to adulticide for mosquitoes, however this work would be completed under a separate permit or PMP held by the Ministry of Health Services.

The *British Columbia Integrated Pest Management Act* and the *Integrated Pest Management Regulation* require pesticides to be applied pursuant to the principles of IPM. This in turn required the development of a Pest Management Plan (PMP) and the use of pesticides in accordance with the terms and conditions of the Integrated Pest Management Regulation and the commitments made in this PMP.

## 1.1. Geographic Boundaries of this Pest Management Plan

This PMP applies to the entire City of Prince George as well as some areas extending beyond the City boundaries. The PMP includes all areas within the municipal boundaries as well as some additional areas outside but adjacent to the City boundaries including sites within the Regional District of Fraser-Fort George. These are small low lying areas that are known breeding habitat and

are near enough to populated areas within the City that they must be treated to preserve the integrity of the program.

These areas may include:

- The Lheidli T'enneh band office and vicinity ranging south to the floodwater channel off Beaver Forest Road.
- West of the City boundary along the Nechako River along Takla Forest Road.
- East of the City boundary to the Denicola subdivision
- Southeast of the City boundary adjacent to Blackburn
- Northeast of the City boundary on Goose Country Road
- South of the City boundary along Haldi Lake Road including Haldi Lake
- South of the City boundary, ditches on East Beverly Road

Within this area, all municipal, private, crown, and Regional District land is included with permission of the applicable owner, agency or authority. A map of the geographic boundaries to which this PMP applies can be found in Appendix A. Detailed maps displaying the locations of larval development sites can be viewed by contacting Claire Watkins, IPM Coordinator at 250-561-7600.

### **1.1.1 Regions Within the City**

A major change that took place within the structure of the program in 2005 was the division of the treatment area into six community associated regions, the Hart, College Heights, Blackburn, Cranbrook Hill, Fraser Vista and City Centre.

#### **Hart Region**

The Hart region is located north of the Nechako River and extends north to the City boundary. This is the largest region with respect to area and number of sites. The breeding sites range from ornamental ponds in residents' yards to large woodland pools on public land.

#### **College Heights**

College Heights is located in the southwestern region of the City and has been combined with Vanway and Beverly. This area is primarily comprised of woodland ponds, grassland pools and ponds, rain pools and snowmelt pools.

#### **Blackburn**

The Blackburn region is located in the eastern area of the City limits and encompasses the area surrounding the Prince George Airport. Ditches,

sewage lagoons and wet depressions in fields make up the majority of the sites in this area.

### **Cranbrook Hill**

Cranbrook Hill is a small agricultural community located along the mid-western border of City limits. The sites in this area are mostly wet depressions in fields, ditches, woodland ponds and pooling off of small streams.

There are untreatable areas in this region, such as a certified organic farm. A map of these areas was obtained to prevent any intrusions and is an appendix to this plan. As the location of these fields can change from year to year, the organic farmer should be contacted prior to program commencement each season.

### **Fraser Vista**

Fraser Vista is located in the North East corner of the City, which encompasses a small area near the PG Sawmill and Canfor property and includes the Shelly Reserve. This region is comprised of a collection of large sites along the Fraser River that are categorized as temporary floodwater sites located in forested areas and grassland depressions.

### **City Centre**

The City Centre is the area commonly referred to as “The Bowl” in Prince George. The sites in this area primarily located in public spaces and are generally temporary rain pool and snowmelt pool sites. Sites such as Cottonwood Island Park and Hudson’s Bay Slough are in this region.

## **1.2. Responsibility for the Integrated Mosquito Control Program**

The person responsible for managing pests within the City of Prince George and therefore the primary contact for information relating to this Pest Management Plan is Claire Watkins, Integrated Pest Management Coordinator for the City of Prince George. Ms. Watkins can be contacted at 250-561-7600.

## **1.3. Time Period of this PMP**

This PMP shall be in force for a five-year period from the date that a Pesticide Use Notice (PUN) has been submitted to the BC Ministry of Environment and confirmation of the plan has been received. This project will run from March 2016 to March 2021.

## 1.4. Outline of this PMP

The content of PMP's prepared in the Province of British Columbia is legislated under the *Integrated Pest Management Regulation* (section 58) and the checklist provided in the *Regulation* is included in Appendix B. This PMP will describe the City of Prince George Nuisance Mosquito Control Integrated Pest Management Program including monitoring activities, treatment decisions, treatment options, and treatment evaluations.

It will also outline the operational procedures conducted by the City of Prince George to ensure safe methods of transporting, storing, handling and applying the pesticides used in this program. This PMP will address the City of Prince George's policies for disposing of empty pesticide containers and unused pesticide, as well as for responding to pesticide spills.

There will be a discussion of the City of Prince George's strategies for the protection of community watersheds, domestic and agricultural water sources, fish, wildlife, riparian areas, and food intended for human consumption.

Finally this PMP will outline the commitments of the City of Prince George with respect to maintaining pesticide records and submitting annual reports and notices.

## 2. Integrated Pest Management

A requirement of all PMPs in British Columbia is an explanation of how the applicant (the City of Prince George) will utilize the elements of Integrated Pest Management (IPM). The six elements of an IPM strategy that will be discussed in detail in the following sections are:

- 1) A strategy to *prevent* organisms from becoming pests (planning)
- 2) A method to *identify* pests
- 3) A *monitoring* (surveillance) program
- 4) A description of the *injury thresholds* used to make treatment decisions
- 5) *Treatment options* and selection criteria, and
- 6) A method for *evaluating effectiveness* of pesticide use.

### 2.1. Prevention (Planning)

Prevention is one of the most important options for successful mosquito control. The City of Prince George actively pursues the following preventative measures in its mosquito control program.

- 1) Reduction and/or modification of mosquito larval development sites and,
- 2) Public Education.

### **2.1.1. Source Reduction/Modification**

The City of Prince George actively encourages the reduction of mosquito larval development sites and water management as effective methods of mosquito control. The fact that mosquitoes require water to develop is the key to their effective control. Without standing water there are no mosquitoes, as mosquitoes are unable to complete their life cycle without water.

Source reduction is simply the use of physical methods to eliminate standing water by draining or filling in mosquito larval development sites. Public education will include tips on reducing standing water around the home (i.e., clear eave troughs of debris so they can drain properly, empty water holding containers, keep water from pooling on swimming pool covers, etc). In addition, City staff will identify sites that are within the municipal land base, are outside of riparian habitats, and can be accessed with appropriate equipment for filling them in or promoting draining (as in the case of ditches). When available, the City of Prince George will undertake participation in voluntary tire collection/recycling opportunities. Through education and awareness and providing collection sites, unused tires can be voluntarily brought in to be recycled. Tires can be significant breeding sites if left with water in them.

If draining or filling are not options, many mosquito larval development sites such as sewage treatment ponds, ditches, farm dugouts, and ornamental ponds can be made unsuitable for mosquito larval development through a combination of good design (i.e., steeply sloped and graveled shorelines), water level manipulation, and control of emergent vegetation. Bodies of water with sloped, graveled, rocky or sandy shorelines will generally support fewer mosquitoes, as larvae will be exposed to wave action and will have difficulty obtaining food. In additions, scraping of sediment from the bottom of roadside ditches every few years can make the ditches unattractive for mosquito larval development by enhancing proper drainage. Ditches that are slow to drain may form a series of pocket pools and support lush grasses and weeds, thereby becoming prime larval development sites. Land owners and government agencies will be encouraged to use the above described methods within their lands.

Through public education, homeowners will also be encouraged to participate in habitat management. Ornamental ponds can be outfitted with water agitators such as fountains or aerators. Screens can be placed over rain barrels to prevent female mosquitoes from reaching the water surface to lay eggs (as well as preventing the emergence of larvae already present in the barrels), and compost piles can be turned frequently to prevent the pooling of water on this nutrient rich environment. The public



will be encouraged to manage larval development sites such as children's wading pools and bird baths by draining and replacing the water at least once per week, so that any larvae present will be killed by desiccation.

In some agricultural areas, over-irrigation or flood-irrigation can produce significant larval development habitat. Proper watering of fields at ranching and hay farming operations will be encouraged by the City of Prince George through education. Efforts will be made to contact farmers when over-irrigation, flood-irrigation and/or broken irrigation pipes are noticed. Farmers will be encouraged to alter their practice and/or repair broken irrigation pipes.

### **2.1.2. Public Education**

The City of Prince George has prepared an information sheet describing measures that can be taken by individuals and landowners to reduce the number of larval development sites and to minimize the impact of mosquito populations on quality of life and the health of individuals and landowners where heavy infestations exist. This information is made available on a property by property basis and in the City of Prince George's Spring/Summer Leisure Guide which is provided free to residents. In addition, the City of Prince George website has information concerning mosquitoes, mosquito control and mosquito borne illness.

## **2.2. Identification of the Pest**

Mosquito surveillance allows controllers to identify when and where mosquito pests occur. The City of Prince George has engaged in both ongoing larval surveillance and adult surveillance. All six of BC's mosquito genera have been identified in the City. These are *Aedes*, *Anopheles*, *Coquillettidia*, *Culex*, *Culiseta*, and *Ochlerotatus*. At least Twenty-six different species of mosquitoes have been captured in adult light traps and as larvae in the City.

All of the following species present in the City of Prince George except *Culex territans* (feeds on amphibians) can be considered nuisance species:

<i>Anopheles earlei</i>	<i>Aedes cinereus</i>	<i>Aedes vexans</i>
<i>Coquillettidia perturbans</i>	<i>Culex territans</i>	<i>Culex tarsalis</i>
<i>Culiseta alaskaensis</i>	<i>Culiseta incidens</i>	<i>Culiseta morsitans</i>
<i>Ochlerotatus canadensis</i>	<i>Ochlerotatus cataphylla</i>	<i>Ochlerotatus excrucians</i>
<i>Ochlerotatus fitchii</i>	<i>Ochlerotatus communis</i>	<i>Ochlerotatus diantaeus</i>
<i>Ochlerotatus euedes</i>	<i>Ochlerotatus excrucians</i>	<i>Ochlerotatus fitchii</i>
<i>Ochlerotatus hexodontus</i>	<i>Ochlerotatus implicates</i>	<i>Ochlerotatus increpitus</i>
<i>Ochlerotatus intrudens</i>	<i>Ochlerotatus provocans</i>	<i>Ochlerotatus pullatus</i>
<i>Ochlerotatus punctor</i>	<i>Ochlerotatus sticticus</i>	

In the field, mosquito larvae and adults are very difficult to identify to the species level. For positive identification, mosquitoes need to be examined under a microscope. In the City of Prince George, the determination as to whether a larva is likely to be a pest species or not, will be based on the habitat where the larvae are found and the time of year. Mosquitoes are selective with their habitats. Different species of mosquitoes tend to choose different types of habitats. The time of year can also give clues to the identity of the mosquito species.

Generally, the mosquito larvae that appear in early spring (sometimes even before ice-off) are of the genera *Aedes* and/or *Ochlerotatus*. *Aedes* is the Greek word for disagreeable, and is an accurate reflection of these species in terms of both numbers and ferocity. *Aedes* and *Ochlerotatus* species lay their eggs at the edges of water bodies or in moist soil. Snowmelt species rely on warm temperatures and/or low oxygen levels in water to induce their eggs to hatch. Larvae of the floodwater species appear as soon as their eggs are wetted (following snowmelt and then river flooding). Large areas of habitat often become active simultaneously with rising floodwaters along creeks and rivers and in permanent marshes as the snow melts and raises the water level in the marshes. Therefore, huge numbers of *Aedes* and/or *Ochlerotatus* mosquito eggs hatch at the same time. This is due primarily to the fact that eggs laid by most *Aedes* and *Ochlerotatus* species remain viable for a number of years, and therefore egg concentrations in the soil can become very dense. Whenever habitat along flooding creeks and rivers, ditches, woodland pools or permanent marshes in the spring contains mosquito larvae, it is assumed that these are pest species and treatment of the larvae will be considered.

As the summer progresses, the occurrence of floodwater larvae tends to decrease (unless a large storm event causes flooding, or in the case of agriculture, a farmer over-irrigates, flood-irrigates or fails to repair broken pipes). Water left standing after the spring floods will begin to colonize with species of mosquitoes from the *Anopheles*, *Culiseta* and *Culex*

genera. *Anopheles* mosquitoes are easily recognized in the field as the larvae are much different in appearance from all other larvae in British Columbia. They lay flat on the surface of the water and lack a siphon. All *Anopheles* species in British Columbia can be considered pests and therefore whenever these species are seen, treatment will be considered. *Culiseta* and *Culex* mosquitoes lay their eggs on the surface of standing water and will produce multiple generations over the summer. Most species from each of these genera can be nuisance mosquitoes and/or vectors of mosquito borne illness, so if they are present in high enough numbers, they will be treated.

## **2.3 Monitoring (Surveillance) Program**

The City of Prince George conducts three kinds of surveillance as part of their nuisance mosquito control program: they monitor 1) environmental conditions; 2) larval development sites and larval populations, and 3) adult mosquito populations.

### **2.3.1. Environmental Monitoring**

As the first stage of environmental monitoring, the City of Prince George monitors ambient temperatures, river levels, snow pack levels and precipitation. Monitoring of each of these variables allows mosquito control staff to estimate the size and number of larval development sites that will appear throughout the season.

Also, current weather conditions are monitored as these can affect whether or not treatments are carried out on any given day. Hand treatments of granular larvicides are occasionally deferred during high precipitation events although wind velocity is generally not a factor that affects hand application of larvicides. When helicopter applications are planned, wind and precipitation monitoring is especially important as helicopter treatments are halted when wind conditions (velocity and direction) make it difficult for the pilot to aim granular larvicides at the larval development site (i.e. the pilot is unable to compensate for drift of the granular product due to wind). Also, helicopter campaigns are not possible during precipitation events as the granular larvicides become wet, thus clogging the application equipment. This can result in improper application rates and possible damage to the application equipment.

### **2.3.2. Surveillance of Larval Development Sites and Mosquito Larvae**

An ongoing activity in the nuisance mosquito program is that of searching for and cataloguing mosquito larval development sites. Sites have been identified through ground searches, reports from citizens of the City, and mapping exercises. The City of Prince George has developed a detailed

map that outlines the known larval development sites. Information including owner of the land (private or public), history of monitoring and treatments, and comments concerning the type of larval development site (permanent marsh, snowmelt, transient floodwater site, etc) is maintained and regularly updated. Information such as “no treatment” areas is also included. Examples of “no treatment” or “avoid” areas include those that: the landowner has refused permission; are in environmentally sensitive areas such as wildlife sanctuaries; or are in fish bearing habitats. Site information is updated throughout the season with treatment information and newly located larval development sites.

Once larval development sites have been located, they are included in a schedule for larval surveillance. Depending on the type of habitat, predictions are made as to when they are likely to become active with larvae. The sites are then visited and an assessment as to the number and life stage (instar) of the larvae is made. A 300 ml mosquito dipper is used to collect water from the larval development site and the number and life stage of the larvae is determined. Depending on the size of the larval development site, a number of “dips” may be taken to determine the mosquito population throughout the site. Information as to the average larval density and life stage of the larvae is recorded prior to treatment so that a comparison can be made post-treatment when crews return on another day to the treated sites to assess the effectiveness of the larviciding application.

If the larvae are at an appropriate life stage and in sufficient numbers to meet a threshold level (Section 2.4.1), larviciding activity will be considered. At this point a number of things will be considered. First, the size and characteristics of the site will be examined to estimate the amount of larvicide needed (application rates vary depending on the depth of site and the amount of organic material present). Next, no treatment areas will be considered, and if they cannot be avoided, plans for treatment will stop.

Finally, if possible, the genus of the mosquito will be recorded, however as mentioned earlier, this is often difficult in the field.

### **2.3.3. Surveillance of Adult Mosquitoes**

When possible, adult surveillance will be conducted in the City of Prince George to assess the efficacy of larviciding activities and to identify the species of mosquitoes in a given area. Mosquitoes are specific as to the habitats in which they will lay their eggs and therefore identification of the adults can assist mosquito control staff in their search for likely larval development areas.

For example, if a landowner is concerned about adult mosquito numbers, a light trap could be set up to trap mosquitoes. If *Aedes vexans* is the primary species collected in the trap, staff would know that these mosquitoes came from a floodwater habitat and they would then look for low lying areas around streams or rivers that may have been recently flooded and produced the brood of mosquitoes. In subsequent years, this area could be visited following a flood and prior to emergence of the adults and larviciding be conducted.

## 2.4 Injury Thresholds

Injury thresholds are pre-set parameters that are used by staff to determine whether populations meet a high enough level for treatment (larval or adult control).

### 2.4.1. Thresholds for Larval Treatments

Injury thresholds are pre-set numbers that are used by staff to determine whether pest populations meet high enough level for treatment. The treatment threshold for mosquito larvae is determined by the certified applicator and takes into account a number of variables. The applicator makes a decision as to whether the numbers of larvae present are likely to cause a nuisance if allowed to develop to adults.

As a general guideline, the treatment threshold for mosquito larvae is an average of **three larvae per 300ml dip**. This threshold was selected as it is the standard that has been used in British Columbia and other areas of Canada and the United States. However, the City of Prince George and/or their contractors will consider exceptions to this rule. In some cases, an applicator may decide that an average of three larvae per dip may not be sufficient numbers for treatment. For example, if the larval development site is very small and a good distance from the public, the applicator may decide that allowing the larvae to develop will not pose a nuisance problem and therefore no treatment would be necessary. Or perhaps the technician will determine that the site is likely to dry-up prior to the larvae emerging. Conversely, a technician may encounter a site that is very large and deep with larvae distributed throughout the water column. In this case, it may be difficult to capture three larvae in a dip, however the cumulative number of larvae in the site can be astounding and treatment could be warranted. Certified applicators working for the City of Prince George mosquito contractor, in conjunction with the City of Prince George IPM Coordinator, will make the final decision as to whether or not to carry out larval treatment. No larviciding will be conducted on private property without the consent of the landowner.

## 2.5 Treatment Options

Once a technician determines that a threshold has been met, there are a number of treatment options available. In the case of larvicides, there are bacterial controls (*Bacillus thuringiensis var israelensis*, and *Bacillus sphaericus*) and insect hormone control. Of these, some are short acting while others are longer acting. Of course, there is also the option to perform a physical control, requiring no pesticides at all. Each of these choices will be discussed below.

### 2.5.1. Non-Pesticide Control (Physical Control)

A technician may find a larval development site and encourage the site to be drained (i.e. a pool of water in a farmer's field can be ditched or filled in) or a slowly moving ditch could be dug out and drained. Other options for non-pesticide control are outlined in Section 2.1.1 and these will be considered first, before any pesticide application.

### 2.5.2. Control Options for Larval Mosquitoes

Control of larva using larviciding will be the most common approach for controlling nuisance mosquitoes in the City of Prince George. The City of Prince George will consider the use of any of the registered mosquito larvicides listed below, and this PMP may be updated with any new larvicides that become registered in Canada during the course of this PMP. The list of larvicides proposed for use in the City of Prince George under this PMP is listed in Table 1.

According to the *Integrated Pest Management Regulation* section 78(2), a pesticide free zone is not required around standing water when applying the mosquito larvicides included in this PMP. However, in accordance with section 78(1) of the *Integrated Pest Management Regulation*, mosquito larvicides will not be applied in permanent, fish bearing bodies of water or waters that have permanent, direct, surface water connections with fish bearing bodies of water. Also, larvicides will never be applied to any human drinking water sources. All applications will be done by individuals that hold valid British Columbia Pesticide Applicator Certificates in the Mosquito and Biting Fly Category or by individuals in direct visual or auditory contract with a certified applicator (one certified applicator may legally supervise no more than four non-certified applicators).

#### 2.5.2.1. *Bacillus thuringiensis var israelensis*

The majority of the larval treatment within the City of Prince George will be with granular larvicides containing the active ingredient *Bacillus thuringiensis var israelensis (bti)* (trade names Vectobac, Aquabac and/or Teknar). These products are formulated with byproducts of the metabolism of the bacterium *Bti* which is applied along with paraffin to crushed corncobs that serve as a carrier. *Bti* produces an endotoxin that contains five different proteins that can be digested in the alkaline gut of mosquito larvae. Once digested, the proteins become toxic to the larvae and work to destroy the larvae's gut. The *Bti* products are effective against mosquitoes in the larval stage, and are applied by hand, backpack blower or by helicopter to standing water containing significant populations of mosquito larvae. Application rates vary from 2.5 to 20 Kilograms per hectare (with the higher rates applied to polluted or highly organic water), although most sites are treated at about 5 to 10 kilograms per hectare. Liquid formulations of these products may also be used, although not to the same extent as the granular products.

The benefits of the *Bti* larvicides are many. *Bti* larvicides are considered to be very specific to mosquito larvae and non-toxic to fish, amphibians, reptiles, mammals and most other insects. They are easy to apply and have no residual effect, along with being the most economical of the larval controls. *Bti* larvicides work best when applied to larvae in their 2<sup>nd</sup> and 3<sup>rd</sup> instars, however control can be achieved when applied to 1<sup>st</sup> and early 4<sup>th</sup> instar larvae as well. Death of the larvae usually occurs within 24 hours. This allows for technicians to be able to assess effectiveness soon after application. *Bti* products can be applied to practically any type of standing water including temporary and permanent pools, floodwater, snowmelt pools, irrigation pools, sewage lagoons, retention ponds, ditches, natural marshes and catch basins.

There are very few disadvantages associated with the use of *Bti*, when applied according to the labeled rates; it is virtually non-toxic to all organisms aside from mosquito larvae. However, studies have shown that at application rates 10 to 1,000 times greater than the labeled rates, some effects have been documented on non-target larvae such as chironomids, biting midges and dixid midges. As the *Bti* products have no residual effect, only the larvae present at the time of application are affected. In habitats where multiple generations of larvae appear, more than one application of larvicide may be necessary. Another possible disadvantage is the short window for treatment with optimum control of the larvae in the 2<sup>nd</sup> and 3<sup>rd</sup> instars.

### **2.5.2.2. Bacillus sphaericus**

*Bacillus sphaericus* is sold under the trade name VectoLex. The mode of action of the bacteria is similar to *Bti* in that it produces toxins that attack the gut of mosquito larvae.

The benefits of *Bacillus sphaericus* are also similar to those of *Bti* in that it is virtually non-toxic to non-target organisms while being very effective and specific to mosquito larvae. This product works better than *Bti* when applied to highly organic larval habitats and it has the added benefit of maintaining its effectiveness for up to 28 days and thus can control multiple generations of larvae with a single application. VectoLex CG can be applied to any kind of standing waters, as with *Bti* larvicides. The VectoLex Water Soluble Pouches (WSP) are only registered for use in catch basins at this time, and so it is unlikely that they will be used as part of the nuisance control program as nuisance mosquitoes rarely develop in catch basins. However, if registration changes to allow VectoLex WSP to be applied to standing water other than catch basins, the City of Prince George will consider using these pouches accordingly.

The greatest disadvantage of *Bacillus sphaericus* is its cost. At present, it is the most costly of the larvicides and therefore will only be considered in larval development sites where multiple generations of larvae are known to occur. In these cases, the increased cost of the larvicide may be warranted as fewer applications would be required over the course of the summer.

### **2.5.2.3. Methoprene**

The final type of larvicide that may be used by City of Prince George is methoprene (Trade name Altosid). This larvicide is a mosquito juvenile growth hormone. It is formulated in pellets for use in open water (or catch basins) and as briquettes for use in catch basins (although, at present, a Pesticide Use Permit is required to use Altosid in natural water bodies and thus cannot be applied to natural water bodies under this PMP without a Pesticide Use Permit). This product slowly releases into larval development sites over a specified time period (approximately 30 days for pellets and 60 days for briquettes). The hormone prevents pupal mosquitoes from developing into their adult stage and they die as pupae, unable to feed.

Methoprene has a benefit over the biological products that the pellets can be applied to water that may periodically dry up and



when wetted again, the product will begin to release methoprene and act on new generations of mosquitoes. It is considered safe for applicators to use without significant protective gear and is environmentally friendly. Because the larvae are allowed to develop to their pupal stage, they are present in the water for a longer time than with the bacteria controls and therefore are available to feed natural predators in the habitat.

There are some disadvantages associated with the application of methoprene. At present, methoprene is much more expensive than *Bti*. In the laboratory, high doses of methoprene have been shown to be slightly toxic to non-target organisms such as some crustacean and fish. In the field, when applied according to the label, toxic concentrations are not reached and the product is undetectable in the environment within a few days. However, under this PMP, *Altosid Pellets will only be considered for use in man-made water bodies that would never become contiguous with running water and therefore no permit will be required for application.* Ideal locations include sewage lagoons and cattle dugouts. The greatest disadvantage is that applicators are unable to assess the efficacy of a treatment until after the larvae pupate and therefore if the treatment failed, adult mosquitoes are inevitable.

Altosid briquettes are only registered for use in catch basins and therefore it is unlikely that they will be used as part of the nuisance control program as nuisance mosquitoes rarely develop in catch basins.

**Table 1**

**List of larvicides that are included in this PMP for use in the City of Prince George Nuisance Mosquito Control Program. Selection of the larvicide will be made by the applicator following assessment of the larva development habitat and available resources.**

Trade Name	Formulation	Active Ingredient	PCP No	Application Rate	Application Method*
Vectobac 200G	Granules	<i>Bacillus thuringiensis</i> var <i>israelensis</i>	18158	3-10kg/ha	Ground or Aerial
Aquabac 200G	Granules	<i>Bacillus thuringiensis</i> var <i>israelensis</i>	26863	2.5-20kg/ha	Ground or Aerial
Teknar Granules	Granules	<i>Bacillus thuringiensis</i> var <i>israelensis</i>	19239	4.5-6.7kg/ha	Ground or Aerial
Altosid Pellets	Granules	Methoprene	21809	2.8-11.2kg/ha	Ground
Altosid XR Briquettes (for catch basin treatment only)	36.4g Briquette	Methoprene	27694	For catch basins up to 5500L place 1 briquette per basin	Ground
VectoLex WSP (for catch basin treatment only)	10g water soluble pouch	<i>Bacillus sphaericus</i>	28009	1 pouch per catch basin	Ground
VectoLex CG	Granules	<i>Bacillus sphaericus</i>	28008	5.6-16.8 kg/ha in water bodies & 0.56-1.68 g/m <sup>2</sup> of water surface area in tires	Ground or Aerial

\*Ground applications may be done by hand and/or with blowers and/or with misters. Aerial applications may be with helicopter.

### **2.5.3. Selection of a Treatment Method**

Once a decision has been made to conduct a treatment, the applicator must first decide which product they will use. Next, the decision on how to apply the product will be based on a combination of the following considerations:

#### **FOR LARVAL TREATMENTS**

- 1) The advantages and disadvantages of each pesticide as discussed in Section 2.5.2.
- 2) The life stage (instar) and species of the larvae (single generation mosquito or multi-generational mosquito).
- 3) The characteristics of the larval habitat (high organics, intermittently dry, size, and location of site, predator presence/absence).
- 4) The availability of the larvicide.
- 5) The cost of the larvicide.
- 6) The proximity to fish bearing water and the likelihood of intermittent connection to fish bearing water.

In smaller sites, a hand may be used to spread granular larvicide. In larger sites, a backpack blower may be preferred as this equipment can blow granules great distances and cuts down on the amount of walking an applicator may have to do. Blowers can also be used to blow larvicide water that is too deep for an applicator to wade in.

Finally, aerial control may be selected. Aerial campaigns are costly, but are often the only means of finding, accessing and treating large areas of larval development habitat in a short time frame (while larvae are in appropriate instars). When the snow melts in the spring in Prince George, large areas of land become active with larvae of snowmelt mosquitoes. Also, when river levels peak during spring freshet, huge areas of habitat often become active simultaneously and mosquito control staff are unable to treat all larvae before they pupate. Aerial control is an excellent choice in these circumstances as many of hectares of larval development habitat can be treated in just a couple of days.

## **2.6 Treatment Evaluations**

The final component of an Integrated Pest Management approach is that of treatment evaluation. Post-treatment evaluation can help to improve a program over time as applicators learn which pesticides, application rates, methods and timing worked best at each application site. Constant evaluation of a program and its results will allow City of Prince George staff to improve and refine their nuisance mosquito control program.

The *Integrated Pest Management Regulation* section 78(4b) specifies that the efficacy of a mosquito larvicide be assessed by conducting pre-treatment and post-treatment larval samples of the water being treated. Certified pesticide applicators will conduct and record all pre-treatment monitoring as described in Section 2.3.2. Within 14 days following treatment, certified applicators will return to a representative sample of larval development sites to conduct post-treatment monitoring using the same methods of accessing larvae as described in Section 2.3.2 for pre-treatment monitoring. This information will be used to determine if the rate and type of pesticide application chosen for the location was suitable, and if the application failed, it will allow the applicator to plan for alternate methods of control.

### 3. Operational Information

The following sections describe the City of Prince George's plans for safe handling, preparing, mixing, applying and otherwise using pesticides. Much of the information included in the following sections is drawn directly from the *Integrated Pest Management Regulation* and the *Canadian Pesticide Education Program, Applicator Core Manual, British Columbia Edition (Ministry of Environment 2011)*

#### 3.1 Procedures for Safely Transporting Pesticides

The following procedures for safely transporting pesticides will be practiced by all City of Prince George staff or contractors working under this PMP. The *Integrated Pest Management Regulation* (section 65(1)) legislates that pesticides must be kept, handled, stored and transported in the container in which they were originally packaged and with the labels originally packaged and with the labels originally affixed by the manufacturer, or in containers designed for containing the pesticide and labeled accordingly. Also, section 33(2) of the *Regulation* states that a "person who transports or causes or allows the transport of a pesticide must ensure that the pesticide is secured and transported...in a manner that prevents the escape, discharge or unauthorized removal of the pesticide from the transport vehicle, and prevents the contamination of food or drink intended for animal or human consumption, household furnishings, toiletries, clothing, bedding, or similar items that are transported with the pesticide".

Further, the *Canadian Pesticide Education Program, Applicator Core Manual, British Columbia Edition (Ministry of Environment 2011)*

outlines a number of general precautions to be taken during transport of pesticides, and the City of Prince George of Prince George will adhere to the following practices which are applicable to the use of larvicides:

- 1) All pesticide containers will be inspected for defects prior to transporting.
- 2) Pesticides will never be transported along with food, feed or consumer goods.

- 3) All pesticide containers will be secured to prevent spillage.
- 4) The driver of any vehicle transporting pesticides will be trained in spill clean-up and will carry, along with the pesticides, necessary equipment to contain and/or neutralize a spill.
- 5) Limited amounts of pesticides shall be carried in any one vehicle. The quantity shall be no more than what is necessary for each project, except where transportation occurs between storage facilities.
- 6) Pesticides shall be carried in a secure lockable compartment such as a locked storage box or a canopy.
- 7) Pesticides shall be transported separately from food and drinking water, safety gear and people.
- 8) Pesticides will be transported only with approved, intact labels.

### **3.2 Procedures for Safely Storing Pesticides**

The City of Prince George and/or their contractors will adhere to the following standards of the *Integrated Pest Management Regulation* with respect to the safe storing of pesticides:

- 1) A person who stores a pesticide will store it in a manner that minimizes hazards to human health and the environment (Section 33(1)).
- 2) All pesticides will be stored in the container in which they were originally packaged and with the labels originally affixed by the manufacturer, or in a container designed for containing the pesticide and labeled with the trade name, chemical name, concentration of active ingredient and Pest Control Product number (Section 65(1)).
- 3) All pesticides will be stored separately from food intended for human or animal consumption (Section 66(1a)).
- 4) According to Section 66(1b) all pesticides will be stored in a facility that is:
  - (i) ventilated so that pesticide vapors are vented to the outside (not applicable to granular larvicides),
  - (ii) not used for the storage of food intended for human or animal consumption,
  - (iii) locked when unattended, and
  - (iv) accessible only to persons authorized by the person storing the pesticide.
- 5) According to Section 66 (2), each door providing access to a storage facility, will clearly bear the words "WARNING; CHEMICAL STORAGE – AUTHORIZED PERSONS ONLY" written in block letters.
- 6) According to Section 31, the City of Prince George will inform the local fire department of the pesticide storage location within 60 days after starting to store pesticides.

### **3.3 Procedures for Safely Mixing, Loading & Applying Pesticides**

None of the pesticides listed in this PMP require mixing prior to use. During larviciding campaigns there are few safety precautions necessary due to the non-toxic nature of the pesticides. However, applicators will follow all precautions as described on the larvicide labels.

### **3.4 Procedures for the Safe Disposal of Empty Pesticide Containers & Unused Pesticides**

Empty larvicide containers can be considered a danger to the environment. City of Prince George staff or their contractors will dispose of empty containers as described on the manufacturer's product label. Also, the recommendations described in the *Canadian Pesticide Education Program, Applicator Core Manual, British Columbia Edition (Ministry of Environment 2011)*

will be followed and as a minimum, pesticide containers (such as those that contain Altosid Pellets) will be emptied by and then they will then be triple rinsed. Also, to prevent someone from attempting to reuse the containers, they will be punctured or crushed and then taken to an approved landfill. Granule *Bti* and VectoLex come in plastic or paper bags and the bags will be disposed of in the garbage.

In the unlikely event that the City of Prince George has pesticide that will not be used, the Waste Management Branch of the Ministry of the Environment will be contacted and consulted as to protocols for disposing of the pesticide.

### **3.5 Procedures for Responding to Pesticide Spills**

All of the larvicides in this PMP are solids as either granules or pellets. Therefore, most of the guidelines for Pesticide Spills as outlined in the *Canadian Pesticide Education Program, Applicator Core Manual, British Columbia Edition (Ministry of Environment 2011)*

do not apply. However, spill equipment (i.e. a broom or shovel) will be ready and available at the storage site (including mobile storage). All persons authorized and trained to work with the larvicides will be familiar with the protocol for sweeping up spills. The spill equipment will include:

- 1) A long handled broom.
- 2) A shovel.
- 3) A water proof waste receiving container such as a used larvicide bag which could be taped up.

In most cases, when granular larvicide is spilled it can be scooped up with the applicator's hands and put back in the larvicide bag to be applied to larval habitat.

If a large spill occurs, such as in a vehicle or helicopter accident, the City of Prince George and/or their contractors will follow the recommendations as described in the *Canadian Pesticide Education Program, Applicator Core Manual, British Columbia Edition (Ministry of Environment 2011)*

- 1) The source of the spill will be contained.
- 2) People and animals will be kept away from the spill site and people will be prevented from walking through, or driving through the spill.
- 3) The product label or knowledgeable agencies will be consulted to determine the best course of action for clean-up of the spill.
- 4) If the spill is small enough to be handled without assistance, clean-up will begin immediately.
- 5) Personal protective gear will be worn during the clean-up.

## **4. Environmental Protection Strategies & Procedures**

The following sections describe the City of Prince George's policies for protecting the environment. Much of the information included in the following sections is drawn directly from the *Integrated Pest Management Regulation* and the *Canadian Pesticide Education Program, Applicator Core Manual, British Columbia Edition (Ministry of Environment 2011)*

### **4.1 Strategies to Protect Community Watersheds and Domestic & Agricultural Water Sources**

The City of Prince George and their contractors will follow the guidelines contained in the *Forest Practices Code of British Columbia Act* to protect community watersheds. Because the City of Prince George is not proposing the use of adulticides, most of the guidelines do not apply. The guidelines are listed below:

- 1) The location of community watersheds will be determined by accessing the Ministry of Environment Community Watershed website:  
[http://www.env.gov.bc.ca/wsd/data\\_searches/comm\\_watersheds/index.html](http://www.env.gov.bc.ca/wsd/data_searches/comm_watersheds/index.html)  
(not applicable to larviciding practice).
- 2) A 10m pesticide free zone will be maintained around all streams, lakes and other water bodies (not applicable to larviciding practice).
- 3) A 100m no treatment zone shall be maintained upslope of a community water supply water intake (not applicable to larviciding practice).
- 4) An adequate buffer zone will be maintained around no treatment.
- 5) No mixing of pesticides will occur within a community watershed (not applicable to larviciding practice).
- 6) No pesticides will be stored within a community watershed.

In order to protect domestic drinking water and water for agricultural use, the City of Prince George and/or their contractors will strictly adhere to all standards for pesticide-free zones (PFZs) and (NTZs) as specified in the *Integrated Pest Management Act and Regulations*. Table 2 lists the PFZs and the NTZs for larval mosquito control applications.

**Table 2**

**Standards as described in the *Integrated Pest Management Regulation (IPMR)* for Pesticide Free Zones (PFZ) and No Treatment Zones (NTZ) to protect water during mosquito control activities.**

Insecticide	Water Source	Regulation	Applicable Section from IMPR
<b>Bacterial Larvicides</b>	Water supply intake or well used for domestic or agricultural purposes, including water for livestock or for irrigation or crops	Exempted from PFZ	71(12)
	Bodies of water* and streams	Exempted from PFZ however no treatment allowed in permanent, fish bearing bodies of water or waters that have permanent, direct, surface water connections with fish bearing bodies of water.	78(2); 78(1)
<b>Non-Bacterial Larvicides (Methoprene)</b>	Water supply intake or well used for domestic or agricultural purposes, including water for livestock or for irrigation or crops	30m NTZ unless applicator is reasonably satisfied that the smaller zone will ensure that pesticide from the use will not enter the water supply intake or well.	71(3); 71(4)
	Bodies of water* and streams	Exempted from PFZ however no treatment allowed in permanent, fish bearing bodies of water or waters that have permanent, direct, surface water connections with fish bearing bodies of water.	78(2); 78(1)

\*"Body of water" does not include a human-made, self-contained body or structure for water.



## **4.2 Strategies to Protect Fish & Wildlife, Riparian Areas & Wildlife Habitat**

Riparian areas are defined as the areas around bodies of water. These areas usually contain lush vegetation and high biodiversity (birds, insects, reptiles, amphibians, plants and mammals). Riparian areas are important for stream, lake and marsh health as they support vegetation that maintains bank stability and provide cover for water bodies to help maintain cooler water temperatures. With respect to pesticide applications, herbicides are generally considered the most dangerous pesticides in these ecosystems; however chemical insecticide applications are also of great concern.

Due to the low toxicity of the bacterial larvicides, applications will be conducted within riparian areas, however care will be taken to keep impacts on vegetation and soil at a minimum (i.e. attempt will be made to stay on paths and avoid trampling vegetation). Also, as per the *Integrated Pest Management Regulation*, fish habitat will be protected as no larviciding will take place in fish bearing waters with continuous direct surface water connections with fish bearing waters.

## **4.3 Strategies to Prevent Contamination of Food Intended for Human Consumption**

The larvicides proposed for use in this PMP will not cause contamination of food intended for human consumption. This is due to their physical properties and their use only in aquatic areas. However, general guidelines for safety will be followed by applicators (i.e. applicator will wash hands before eating and food will be stored separately from pesticides and equipment used for larviciding).

## **4.4 Pre-Treatment Inspection Procedures for Identifying Treatment Area Boundaries**

When planning to larvicide, the applicator will ensure that he or she has permission to treat the site, and the applicator will ensure that he or she is not treating in a permanent, fish bearing body of water or waters that have permanent, direct, surface water connections with fish bearing bodies of water.

## **4.5 Procedures for Maintaining & Calibrating Pesticide Application Equipment**

Constant calibration of larviciding back-pack blowers and aerial application equipment will be done daily during all treatments. As these products broadcast spread the larvicide granules, applicators must be aware of the spread pattern and its correlation to application rate. Spread pattern "posters" are displayed at the larvicide storage shed, and applicators are encouraged to look at these often. Applicators will be trained on the appropriate use of backpack blowers so they are able to adjust their calibration as they walk through and around standing water (walking slower and faster).

#### **4.6 Procedures for Monitoring Weather Conditions & Strategies for Modifying Pesticide Application Methods for Different Weather Conditions**

During larvicide activities (hand application, backpack blower application or helicopter application), the following weather conditions will be considered:

- 1) Precipitation (weather forecasts may be consulted and conditions at the site will be observed). In significant rain events, the aerial larviciding equipment can be clogged and so in the event of significant rain, aerial application may be postponed.
- 2) Wind speed will be observed and recorded once per day. When wind speeds reach a level that causes granular product to drift outside of the treatment area (i.e. the applicator is no longer able to control the placement of granules accurately), application will be postponed.
- 3) Temperature is not a factor in larviciding treatments although at present this variable will be recorded once per day to comply with current pesticide legislation.

*It should be noted that the Pest Management Section of the Provincial Government is currently working on an amendment to the Integrated Pest Management Act which will eliminate the requirement for recording environmental variables (wind speed, temperature, and precipitation) during granular applications of larvicide for mosquito control. If this amendment should come during the term of this PMP, the City of Prince George and its contractors will follow the direction of the amendment.*

### **5. Records & Reporting**

Under the *Integrated Pest Management Regulation*, the City of Prince George and their contractors are required to maintain records of all pesticide applications and submit an *Annual Record of Pesticide Use* and an *Annual Notice of Intent to Treat*.

#### **5.1 Treatment Records**

The City of Prince George will maintain, for three years from the date of treatment, records of all pesticide applications including:

- 1) Treatment location
- 2) Pre-treatment monitoring results (larval dips)
- 3) Treatment and date
- 4) Type of pest targeted (mosquito larvae)
- 5) Trade name of pesticide used and its PCP number
- 6) Method of application
- 7) Rate of application
- 8) Total quantity of pesticide used

- 9) Relevant meteorological conditions (i.e. wind, precipitation, temperature) unless this requirement is changed by the Ministry of Environment since it is not applicable to granular application of larvicide.
- 10) Result of post-treatment monitoring and evaluation
- 11) If the applicator decides that the 30m non-treatment zone around a water supply intake or well used for domestic or agricultural purposes may be reduced, the information on which the decision was based.

## **5.2 Records of Larval Development Sites**

The City of Prince George will work towards creating records of all larval development sites, including:

- 1) GPS location or description of the location of the site
- 2) Name, address and phone number of owner or manager of the treatment site
- 3) Information concerning no-treatment areas or areas where permission has not been granted by the landowner.

## **5.3 Annual Report of Pesticide Use**

By January 31<sup>st</sup> of every year, the City of Prince George will submit an *Annual Report of Pesticide Use* to the Administrator of the *Integrated Pest Management Regulation* which will include a summary of the previous calendar year's use including:

- 1) The name and address of the City of Prince George and their confirmation number
- 2) The trade name, PCP registration number, active ingredient name (s) and amount of pesticide product used in kilograms
- 3) The total area treated with each product.

## **5.4 Annual Notice of Intent to Treat**

The City of Prince George will provide a *Notice of Intent to Treat* to the Administrator of the *Integrated Pest Management Regulation* 21 days prior to the commencement of the project in each calendar year of the PMP confirmation. The *Notice of Intent to Treat* will contain the following information:

- 1) The name and business location of the confirmation holder
- 2) A description of the proposed treatment locations for the calendar year and a map or diagram that clearly identifies those locations
- 3) A description of the proposed treatment for each area, including the pesticide to be used and its method of application.
- 4) The total area of the treatment areas in the proposed treatment locations for the calendar year.

## 6. Consultation

The *Integrated Pest Management Regulation* specifies that persons preparing a PMP must conduct public consultations. The *Integrated Pest Management Regulation* specifies that the consultation must include newspaper notices and “reasonable” efforts to contact and consult within individuals who have the potential to be impacted by a proposed pesticide use under the PMP. The City of Prince George completed all necessary consultations as described in the following sections.

### 6.1 Consultation Process

#### First Nations Consultations Summary for City of Prince George PMP

First Nation	1st contact	Letter received	Response to letter	2nd contact	Additional notes
Carrier Chilcotin Tribal Council					As per SEA consultation map, no consultation is required for this PMP
Lheidli T'enneh First Nation	Letter hand delivered Jan 31, 2016 to Jason Morgan, Executive Director by Chris Bone of the City of Prince George		None	E-mailed Jason Morgan, Feb 29, 2016 E-mailed Jason Morgan and Chus Sam to notify Lheidli T'enneh that the PMP was submitted for registration.	No response to e-mail. Followed up with visit to Lheidli T'enneh Economic development office, Mar 3, 2016. Was informed to submit consultation request to Chus Natlo Sam, Natural Resources Referrals Officer. I sent the requested e-mail, Mar 3, 2016 April 4, 2016, received e-mails from J Morgan and Ibraheem Ali (new Lands Manager)

Nak'azdli Band	Registered letter, sent Jan 29, 2016	Feb 1, 2016	None	Called Nak'azdli office. Spoke to Genevieve Martin, Health director who advised an e-mail sent directly to Chief, Fred Sam. Sent e-mail Feb 29, 2016. No response.	Sent e-mail April 4, 2016, notification of PMP being submitted for registration.
Nazko First Nation	Registered letter, sent Jan 29, 2016 Confirmed address and resent letter Feb 22, 2016	1 <sup>st</sup> letter returned, vacant. Letter received Feb 24, 2016	Received Phone message from Jamie Dagneault, referrals clerk, Feb 24, 2016.	Was advised that they do not accept paper referrals and that I needed to submit request through WeCit portal.	Received letter by e-mail, April 4, 2016. Nazko has no specific comments regarding our PMP

## 6.2 Public & Stakeholder Response to the Amended PMP

No response from registered letters to Organic farmer but we have an understanding that the City will contact him every spring to ensure we have the correct maps for his organic farm.

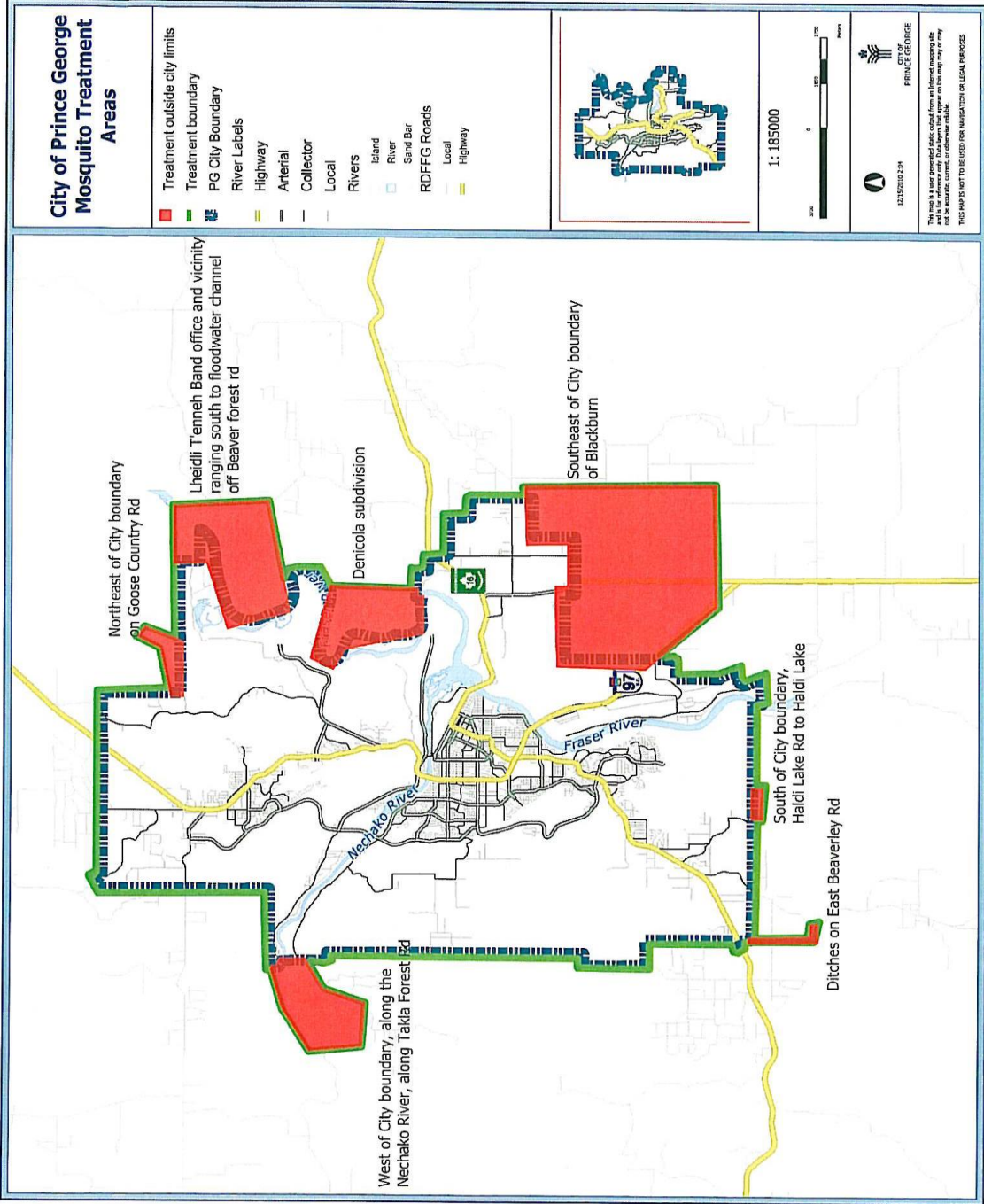
No response from registered letter to Prince George Beekeepers.

No response to newspaper ads or submission forms on City of Prince George website.

## Appendix A

### Map of the Geographic Boundaries Described within this PMP

This map shows the boundaries of the City of Prince George of Prince George Nuisance Mosquito Control Program. Mosquito control treatments may be conducted anywhere within these boundaries.



## Appendix B

### Checklist of Required Information for the Development of Pest Management Plan From Section 58 of the Integrated Pest Management Regulation

	Section of IPMR	Task	Associated Section within this PMP
√	58 1(a)	Description of geographic boundaries with maps, etc	Section 1.1, Appendix A
√	58 1(b)	Person responsible for managing pests in relation to land described above.	Section 1.2
√	58 1(c)	Principal contact for information	Section 1.2
√	58 2(a)	Description of the program to prevent organisms from becoming pests	Section 2.1
√	58 2(b)	Description of pest identification or techniques for pest identification	Section 2.2
√	58 2(c)i	Description of monitoring methods of environment and target population before and during pesticide use	Section 2.3
√	58 2(c)ii	Description of monitoring frequency of above before and during pesticide use	Section 2.3
√	58 2(c)iii	Collected data of 2(c)i before and during pesticide use	Section 2.3
√	58 2(d)i	Treatment threshold and description of how it was chosen	Section 2.4
√	58 2(d)ii	How treatment threshold will be applied	Section 2.4
√	58 2(e)i	Description of all possible treatment methods	Sections 2.5.1, 2.5.2
√	58 2(e)ii	Rational for treatment selection	Sections 2.5.1, 2.5.2
√	58 2(e)iii	Benefits and limitations for each possible method under Sec 2(e)i	Sections 2.5.1, 2.5.2
√	58 2(e)iv	Description of how treatment method was chosen	Section 2.5.3
√	58 2(f)i	Description of monitoring methods of pesticide efficacy and environmental effects	Section 2.6
√	58 2(f)ii	Description of frequency of monitoring of above	Section 2.6
√	58 2(f)iii	Description of data collected for 2(f)i	Section 2.6
√	58 3(a)i	Procedures for safely transporting pesticides	Section 3.1
√	58 3(a)ii	Procedures for safely storing pesticides	Section 3.2
√	58 3(a)iii	Procedures for safely mixing, loading and applying pesticides	Section 3.3
√	58 3(a)iv	Procedures for the safe disposal of empty pesticide containers and unused pesticides	Section 3.4
√	58 3(a)v	Procedures for responding to pesticide spills	Section 3.5
√	58 3(b)i	Strategies to protect water sources and community watersheds.	Section 4.1
√	58 3(b)ii	Strategies to protect fish, wildlife, riparian areas & wildlife habitat	Section 4.2
√	58 3(b)iii	Strategies to prevent human food contamination	Section 4.3
√	58 3(b)iv	Pre-treatment procedures for identifying treatment area boundaries	Section 4.4
√	58 3(b)v	Procedures for calibrating application equipment	Section 4.5
√	58 3(b)vi	Procedures for monitoring weather conditions	Section 4.6

## Appendix C

Copy of the Advertisement published in the Prince George Citizen on February 2 , 2016 and February 11, 2016.



### CITY OF PRINCE GEORGE

### DEVELOPMENT OF A PEST MANAGEMENT PLAN

**Pest Management Plan Number:**  
City of Prince George of Prince George PMP-MOS-2016/2021

**Applicant:** City of Prince George, 1100 Patricia Blvd., Prince George, BC V2L 3V9. Tel: (250) 561-7600 Fax: (250) 612-5612 Attention: Claire Watkins, IPM Coordinator

**Application Method:** Larval Control: backpack blower, helicopter and hand application.

**Pesticides:** The active ingredients and trade names of the Pesticides (including bacterial agents) proposed for use under this plan include: *Bacillus thuringiensis var israelensis* (Vectobac 200G, Aquabac 200G & Teknar G); *Bacillus sphaericus* (VectoLex WSP & VectoLex CG); Methoprene (Altosid XR briquettes and Altosid Pellets);

**Location:** Within the municipal boundary of the City of Prince George and the surrounding adjacent areas including:

- The Lheidli T'enneh band office and vicinity ranging south to the floodwater channel off Beaver Forest Road.
- West of the City boundary along the Nechako River along Takla Forest Road.
- East of the City boundary to the Denicola Subdivision
- Southeast of the City boundary in Blackburn
- Northeast of the City boundary on Goose Country Road
- South of the City boundary along Haldi Lake Road, including Haldi Lake
- South of the City boundary, ditches along East Beverley Road.

This PMP includes crown, private and Regional District lands within this boundary by permission of the applicable landowners or agency.

The selection of larvicides has been chosen to target mosquito populations in the most environmentally responsible manner. The use of pesticides is intended within the area to which the pest management plan applies.

**The proposed duration of the PMP is from March, 2016 to March, 2021.** A draft copy of the PMP and maps of the proposed treatment areas may be examined in detail at the address listed above and on the City of Prince George website, under Topics of Interest. A person wishing to contribute information about a proposed treatment site, relevant to the development of the Pest Management plan, may send copies of the information to the applicant at the address above within 30 days of the publication of this notice.



## Appendix D

### Letter sent to the First Nation Stakeholders Requesting Input regarding this PMP

January 29, 2016

Name of First Nation  
Address  
City, Province, Postal Code

#### Re: Pest Management Plan (PMP)

Dear Chief and Council

The City of Prince George is in the process of renewing the Pest Management Plan (PMP) for nuisance mosquito control within the City of Prince George and specific areas adjacent to but not within the City of Prince George boundary. A copy of the boundary map has been enclosed. As this PMP includes the application of pesticide by the City of Prince George and its contractor, we are seeking comment from the [Insert First Nation Name].

Please be advised that this letter forms part of the Crown's consultation process for the following proposed pesticide use:

Control of mosquito larvae only by the use of the following larvicides:

The complete list of active ingredients and trade names of the proposed larvicides for use under this plan include: *Bacillus thuringiensis* var *israelensis* (Vectobac200G, Aquabac 200G, & Teknar G); *Bacillus sphaericus* (VectoLex WSP & VectoLex CG); and Methoprene (Altosid XR briquettes and Altosid Pellets). The City of Prince George has not included adulticides in their nuisance mosquito control plans.

Mosquito control activities will begin in April of each year and may extend as late as September each year.

Treatments under this PMP may occur within the following parameters: within the proposed boundary area, all municipal, private, crown and Regional District land is included with permission of the applicable owner, agency or authority. A map of the geographic boundaries to which this PMP applies can also be found in Appendix A of the PMP which can be seen at Prince George City Hall. A copy of the proposed PMP may be sent, upon request. The City of Prince George would welcome an opportunity to provide a copy of the proposed draft PMP and discuss any matters with a representative of the First Nations to ensure that the information presented is properly

understood by both parties and address any concerns, with the intent being to carry on further meaningful consultation as needed.

In accordance with the requirements of the British Columbia *Integrated Pest Management Act* and Regulations, we would like to ask you following questions;

- a. What traditional activities have been or are being practiced within the proposed area and where have they taken place?
- b. Do you have any technical or traditional knowledge of the area under application which would assist us in assessing the impact of this application on your traditional interests or treaty rights?
- c. Do you have any concerns regarding potential impacts of our proposed activities on your asserted aboriginal interests or treaty rights, and if so, can you provide proposals on how we may address those concerns?

If you would like to submit information pertaining to this plan, please do so in writing by February 29, 2016. Alternately, we welcome an opportunity to meet with a representative of the First Nations, in person, to ensure that the information that has been exchanged in the initial correspondence is properly understood by both parties, with the intent being to carry on further meaningful consultation as needed. To do so, please contact, Claire Watkins, IPM Coordinator for the City of Prince George at (250) 561-7600.

If you would like to speak to a Ministry representative directly about the proposed pesticide use outlined in this letter, please contact the following Ministry of Environment Regional Office at;  
#325, 1011 Fourth Avenue, Prince George BC V2L 3H9 Phone: (250) 565-6135.

Sincerely

Claire Watkins  
Integrated Pest Management Coordinator  
Parks and Solid Waste Services Division  
City of Prince George