

PEST MANAGEMENT PLAN

May 08, 2023

RDOS-MOS-PMP-2023/2028

Nuisance Mosquito Control Plan

Regional District Okanagan-Similkameen

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1 Introduction

This plan recognizes that the regional government and local municipalities operate on the unceded, traditional territory of the syilx peoples. This plan also recognizes that ongoing communication and information sharing will be an integral component of the Mosquito Control Program.

The overall objective of the Regional District of the Okanagan-Similkameen (RDOS) Mosquito Control Program is to ensure public health, safety and relief through appropriate levels of mosquito control that will meet with maximum tolerance of biting insect populations. It is safe to say that all biting mosquitos are a nuisance; some also happen to vector disease. With this premise, the RDOS has conducted a mosquito control program for nearly 50 years (since 1974). The program is based on the principals of Integrated Pest Management (IPM) in that the most environmentally sensitive methods of control are considered first. The RDOS intends to include the following activities in its program: mosquito larval habitat reduction and mitigation, monitoring, identification, public education, and mosquito larval control using species-specific larvicide applied by hand, backpack applicator and helicopter. **Adulticiding will not be conducted in the RDOS under this PMP.**

In areas adjacent to substantial untreated larval development habitat, mosquito populations can overpopulate rapidly. When this happens, quality of life for residents in the area can decrease due to severely limited outdoor activity. In some cases, human and animal health can be affected as some mosquito species are capable of transmitting illnesses such as Western Equine Encephalitis, Canine Heartworm and West Nile Virus. Further, mosquitoes can generate negative economic impacts with reduced tourism, losses in the cattle industry (cattle growth is reduced as mosquitoes cause annoyance and can interfere with cattle feeding), and loss of commercial fruit production farm workers due to the unrelenting frustrations and even reduced property values.

Prevention and reduction of mosquito larval development sites is the primary objective of the RDOS program, as preventing a problem is always better than trying to control the problem once it occurs. However, in reality, there are few instances in which habitat prevention is possible and therefore the vast majority of the RDOS mosquito control campaign is focused on controlling mosquitoes while they are in their larval stages, as opposed to their adult stage, for two reasons. Firstly, larval control is much more efficient than adulticiding – it is possible to treat very high numbers of larval mosquitoes when they are contained in their water habitats reducing the number of biting mosquitos and the amount of eggs that are laid. Adult mosquitoes tend to disperse soon after emerging over a much wider area making control difficult. Secondly, larvicides such as Aquabac, Vectobac and VectoLex are species-specific affecting only aquatic members of the Order Diptera, which includes mosquitoes and black flies, and do not affect non-target species such as beneficial pollinators or aquatic invertebrates. **Note:** The program, as robust as it is, is not capable nor designed to eradicate mosquito populations, but rather it attempts to reduce their numbers in densely populated areas to a reasonable level.

The BC *Integrated Pest Management Act* and the *Integrated Pest Management Regulation* require pesticides to be applied pursuant to the principles of IPM. This in turn requires the development of a Pest Management Plan (PMP), 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

The RDOS covers a land base of 10,400 km² and includes six municipalities, four First Nations groups (Upper Similkameen Indian Band, Lower Similkameen Indian Band, Osoyoos Indian Band and Penticton Indian Band) and eight Electoral Areas. This PMP covers the City of Penticton, the District of Summerland, and the Towns of Osoyoos, Oliver as well as Electoral Areas “A”, “B”, “C”, “D”, “F”, “G”

and “H”. Within the participating municipalities and Electoral Areas, private, public and crown lands are all included. **However, no mosquito control (habitat modifications or larviciding) will be conducted without the 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 individual larval development sites can be viewed at the Regional District Okanagan-Similkameen office located at 101 Martin Street, Penticton, B.C., V2A 5J9.

1.2 Responsibility for the Integrated Mosquito Control Program

The person responsible for managing pests within the RDOS is the Manager of Utilities, Liisa Bloomfield. As the Mosquito Control Program Supervisor, Shelley Fiorito should be considered the primary point of contact and can be reached at (250)490-4110.

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. It is anticipated that this project will run from May 18, 2023 through May 18, 2028.

2 Integrated Pest Management

A requirement of all PMPs in British Columbia is an explanation of how the applicant (in this case, the RDOS) will utilize the elements of Integrated Pest Management (IPM). The six elements of an IPM strategy will be discussed in the following sections:

- 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 RDOS 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 RDOS encourages the reduction of mosquito larval development sites and water management as effective methods of mosquito control.

Without standing water, the life cycle is interrupted, 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. If draining or back-filling is not an option, many mosquito larval breeding sites such as storm water retention ponds, sewage treatment ponds, farm dugouts, ornamental ponds, and birdbaths can be made unsuitable for mosquito larval development through a combination of good design (*e.g.*, steeply sloped and graveled shorelines), water level manipulation, control of emergent vegetation and education. The RDOS is committed to conservation and the education of property owners on the options available for keeping their ponds healthy and nuisance mosquito populations under control.

In some cases, the technicians may recommend that semi-permanent ponds that support non-target species may be excavated or have their edges steeply sloped or cleared of thick vegetation by the land owner (special care and consideration will be made when these are naturally occurring habitats to ensure protection of non-target biota). Bodies of water with sloped gravel, rocky or sandy shorelines are less desirable for mosquito habitat, as larvae are more easily exposed to wave action and predators. In addition, scraping of sediment from the bottom of roadside ditches every few years can make the ditches unattractive for mosquito breeding by maintaining efficient drainage patterns. Ditches that are slow to drain may form a series of pocket pools and support lush grasses and weeds, thereby becoming prime larval breeding sites.

The RDOS will encourage landowners to participate in habitat management. Ornamental ponds can have water fountains or bubblers installed to agitate and oxygenate the water to prevent stagnation. Screens can be placed over rain barrels to prevent females from reaching the water surface to lay eggs (as well as the emergence of larvae already present in the barrels to escape). Larval development sites such as children's wading pools, stock tanks, and birdbaths should be drained and the water replaced at least once per week to prevent the growth and maturation of mosquito larvae.

In some agricultural areas, over-irrigation or flood-irrigation can produce significant larval development habitat. Proper watering of fields for commercial fruit production, vineyards, ranching and hay farming operations will be encouraged by the RDOS through education. Efforts will be made to contact farmers when over-irrigation, flood-irrigation or

broken irrigation pipes are noticed. Farmers will be encouraged to alter their practices and/or repair broken irrigation pipes.

2.1.2 Public Education

Annually, and as situations require, the RDOS engages in public education initiatives including brochures, articles in local newspapers, interviews, radio, television and advertising. The message of these programs is consistent. Reduce standing water around the home (*e.g.* clear eavestroughs of debris so they can drain properly, empty water holding containers, keep water from pooling on swimming pool covers, *etc.*); to practice personal protective measures (wear DEET and long-sleeved shirts and pants); and to learn to recognize mosquito larvae (many people think they are “worms”, “tadpoles” or “little fish”) as well as the educating residents on the detrimental impacts of self-treating water with home remedies such as diesel fuel, dish soap, insecticides sprayed on the surface or any type of food grade or petroleum based oils.

The RDOS website includes information describing the Mosquito Control Program at the following URL:

<http://www.rdos.bc.ca/departments/public-works/pest-control/mosquito-control/>

2.2 Identification of the Pest

Mosquito surveillance process allows an annual sampling program to identify vector mosquitos occur within the region. The primary mosquito species encountered by the Mosquito Control crews are the Aedes, Ochlerotatus, Culex, Culiseta, Anopheles and Coquillettidia. Ochlerotatus (former subgenus of Aedes prior to 2000) was upgraded to the level of genus; although, many authors still use the traditional taxonomic names in their publications and most ground crews

simply refer to these larvae as *Aedes*. The RDOS 2022 year end has larvae identification from our Victoria Entomologist. Note: The following list of species have been identified in the RDOS in the last 5 years, but the list is incomplete and not comprehensive.

- | | |
|-------------------------------------|--|
| 1. <i>Anopheles earlei</i> | 18. <i>Ochlerotatus euedes</i> |
| 2. <i>Anopheles freeborni</i> | 19. <i>Ochlerotatus excrucians</i> |
| 3. <i>Anopheles punctipennis</i> | 20. <i>Ochlerotatus fitchii</i> |
| 4. <i>Aedes cinereus</i> | 21. <i>Ochlerotatus flavescens</i> |
| 5. <i>Aedes vexans</i> | 22. <i>Ochlerotatus implicatus</i> |
| 6. <i>Coquillettidia perturbans</i> | 23. <i>Ochlerotatus increpitus</i> |
| 7. <i>Culex pipiens</i> | 24. <i>Ochlerotatus intrudens</i> |
| 8. <i>Culex tarsalis</i> | 25. <i>Ochlerotatus melanimon</i> |
| 9. <i>Culex territans</i> | 26. <i>Ochlerotatus mercurator</i> |
| 10. <i>Culiseta impatiens</i> | 27. <i>Ochlerotatus provocans</i> |
| 11. <i>Culiseta incidens</i> | 28. <i>Ochlerotatus pullatus</i> |
| 12. <i>Culiseta inornata</i> | 29. <i>Ochlerotatus punctor</i> |
| 13. <i>Culiseta minnesotae</i> | 30. <i>Ochlerotatus sierrensis</i> |
| 14. <i>Culiseta morsitans</i> | 31. <i>Ochlerotatus spencerii var idahoensis</i> |
| 15. <i>Ochlerotatus canadensis</i> | 32. <i>Ochlerotatus spencerii var spencerii</i> |
| 16. <i>Ochlerotatus communis</i> | 33. <i>Ochlerotatus sticticus</i> |
| 17. <i>Ochlerotatus dorsalis</i> | |

In the field, mosquito larvae can be difficult to identify to the species level. For positive identification mosquito larvae needs to be examined under a microscope. Where identification is needed, larvae samples are shipped to an entomologist in Victoria for analysis. 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 this species in terms of both numbers and ferocity. *Aedes* and *Ochlerotatus* species lay their eggs at the receding edges of water bodies in preparation for an aquatic environment. Snowmelt species rely on warming

temperatures and/or changing oxygen levels in the water to induce their eggs to hatch. Larvae of the floodwater species appear as soon as their eggs are wetted (following snowmelt, precipitation, and river flooding), causing large areas of habitat to become active as the rising floodwaters from creeks and rivers pushes up adjacent ground water levels. As a result, huge batches of mosquitoes hatch at the same time. The eggs laid by these species remain viable for many years, causing egg concentrations in the soil to become very dense. When habitats along flooding creeks, rivers and in permanent marshes contain 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. Of the 3 *Anopheles* species that have been identified in the region, two are considered vectors for Malaria so are noted in the prioritization for treatment planning process. *Culiseta* and *Culex* mosquitoes lay their eggs on the surface of standing water and will produce multiple generations over the summer.

The above mentioned mosquitos can be seen as larvae contained within the water column; the only exception to this is the Coquillettidia, aka the Cattail Mosquito. This unique mosquito is the only one to use aquatic plants to breathe and overwinter as larvae. You will not see them in the water column because they attach to the stems of aquatic plants to access oxygen. The female uses a

special secretion to glue its eggs together into floating rafts. When the eggs hatch, the larvae swim down 35 to 75cm underwater and attach themselves to a host plant by inserting their respiratory trumpet. The larvae then progress through all four larval stages, and the pupal life stage underwater. Emergence begins in early summer and continues through the end of September varying in accordance to when the eggs were laid. After emerging the female mates, then quickly finds a host to obtain a blood meal in order to produce her eggs. The larvae overwinter, in varying stages according to when they were laid, then continue their growth with the warmth of the coming season. The entire life cycle takes a year.

The female *Coquillettidia* is an aggressive biter and a major nuisance for people, horses and birds. This species is a vector for both West Nile and Eastern Equine Encephalomyelitis (EEE) and needs to be taken seriously. As they pose a risk to humans, this species is a priority within our program.

2.3 Monitoring (Surveillance) Program

The RDOS conducts two types of monitoring as part of their mosquito control program: they monitor 1) environmental conditions; 2) larval development sites and larval populations.

2.3.1 Environmental Monitoring

The first stage of environmental monitoring includes temperature, snow pack depth, river 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. If a site contains stagnant water and the water table or runoff is rising (or expected to rise), the site will be visited weekly to check for new larvae (as new eggs may be wetted and hatching). If a site is dry, the water

table is dropping and there has been no rainfall, it will be re-visited within 2-3 weeks. Depending on the time of year, specific sites will be checked weekly.

Also, current weather conditions are monitored to best utilize the effectiveness of the treatments. On occasion, hand treatments of the granular larvicide is deferred during high precipitation events or during windstorms. When helicopter applications are planned, wind and precipitation monitoring is especially important as helicopter treatments are halted when wind conditions make it difficult for the pilot to accurately dispense granular larvicide at the larval development sites (*i.e.* the pilot is unable to compensate for drift of the granular product due to wind). Another potential issue for helicopter applications during precipitation events, is if the granular larvicide becomes wet, there is the possibility of it 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 for the mosquito program is searching for and cataloguing mosquito larval development sites. Sites are identified through ground searches and in response to concerns received from citizens of the Regional District. The RDOS has developed an electronic mapping database ArcGIS Field Maps that enables staff to access and amend site data quickly and accurately. This database is continuously updated with coloured polygons and keeps information up-to-date providing an annual, historical overlay and supplements the written data that is collected in the field. The database includes information as to the

owner of the land (private or public), electoral area, last treatment date, total hectares, hectares treated, type of visit, date, larval counts, temperature, wind direction, pesticide used, treatment rates, hazards, history of treatments, and comments concerning the type of larval development site (permanent marsh, transient, floodwater site) or any pertinent information regarding the site. Information such as “no treatment” areas is also included. Examples of “no treatment” or “avoid” areas include landowners who have refused permission; sites in environmentally sensitive areas such as wildlife sanctuaries or fish-bearing habitats. This database is updated throughout the season with treatment information and newly located larval development sites. It will also be made available to adjacent local governments and the four Indian Bands lying within the region and the Okanagan Nation Alliance.

Once larval development sites have been located, they are included in a schedule for larval surveillance. Depending on the type of habitat, (snowmelt, semi-permanent, irrigation overflow, river runoff, groundwater push up...) predictions are made as to when the site is likely to become active with larvae. The sites are then visited (as per the schedule outlined in Section 2.3.1) and an assessment of the larvae collected in the water dips determines the next steps. Often, a number of “dips” are taken to best determine the overall larval density of the site and decide on the best treatment application method. This information is recorded prior to treatment allowing comparisons to be made to post-treatment levels and the effectiveness of the larvicide application.

2.4 Injury Thresholds

Injury thresholds are pre-set values that are used by staff to determine whether pest populations meet a 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 including proximity to residents and farming operations.

As a general guideline, the treatment threshold for mosquito larva is an average of **three per 250ml dip**. This threshold is based on the standard used in British Columbia and other areas of Canada and the United States. However, the RDOS will consider exceptions to this rule if an applicator decides that an average of three larvae per dip may not be a sufficient number for treatment due to location. A technician may encounter a site that is very large and deep containing larvae throughout the water column; in this case, it may be difficult to capture three larvae in a dip, but based on experience and a site evaluation, treatment could be warranted. Certified applicators working for the RDOS will make the final decision as to whether or not to carry out larvicide 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 for control has been met, there are treatment options available. In the case of larvicide, there are bacterial controls: *Bacillus thuringiensis var israelensis*, (preferred larvicide) and *Bacillus sphaericus*. Of these, the first is short acting while the second is longer acting. Of course, there is also the option to perform a physical control, requiring no pesticides at all. These options will be discussed below.

2.5.1 Non-pesticide control (physical control)

A technician may find problem larval development sites that pose unnecessary risk and recommend the site be drained, ditched or filled-in. Also, some persistent man made larval development sites are easily controlled with proper and consistent cleaning and refilling (stock tanks) or regular checks and dumping (ex. tarps). Non-treatment areas like ecological reserves, can produce impressive numbers of biting mosquitos that can get blown into populated areas and cause stress and anxiety to those living there. We encourage those living in proximity to these areas to be vigilant in controlling standing water within their respective properties as well as to wear insect repellent and light colored clothing when spending time outdoors particularly at dusk and dawn when mosquitoes are most active.

2.5.2 Control Options for Larval Mosquitoes

The RDOS will consider the use of any registered mosquito larvicide 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 larvicide proposed for use in the RDOS under this PMP is listed in Table 1 and includes formulations of *Bacillus thuringiensis var israelensis* and *Bacillus sphaericus*.

2.5.2.1 Bacillus thuringiensis var israelensis

The majority of the larval treatment within the RDOS will be with granular larvicide containing the active ingredient *Bacillus thuringiensis var israelensis* (*Bti*) (trade names Vectobac and/or Aquabac). *Bti* is a naturally occurring bacteria found in soils worldwide; it is a bacterial insecticide, not a synthetic derived chemical. *Bti* produces crystal shaped

proteins that only kill the larval stage of the species Diptera (mosquitos and biting black flies). Bti has undergone over 40 years of lab/field research and is target specific. Bti products are formulated using the proteins created in the spores of the bacterium, which is then bound to crushed corncobs using a food grade wax. Bti products are applied by hand, backpack blower or by helicopter to standing water containing significant populations of mosquito larvae. Manufacturer recommended application rates vary from 3 to 10 kilograms per hectare depending on the larvae levels in each particular waterbody. Application rates also vary with the type of BTI product used; for example, Vectobac's maximum treatment rate is 10kg/ha while Aquabac requires a much higher application rate to do the same job (up to 20kg/ha). The lower application rates and the economical benefits makes Vectobac the preferred product of the RDOS Mosquito Control Program.

The benefits of Bti larvicides are many; as mentioned previously, Bti uses the proteins from the spores of the bacteria. When consumed by the target species, the high pH in the gut of the target species activates the proteins which are toxic under those conditions. As a guide, Bti activates in a highly alkaline 9.0 – 10.5 pH, while human and most vertebrates gut pH ranges from 1.5-3.5 or highly acidic, so even if there is exposure to the bacteria, the pH is not within the activation range. This is how the bacteria is targeted specifically to the Order Diptera. It is non-toxic to fish, amphibians, reptiles, mammals and most other insects. It is easy to apply, has no residual effect and is among the most economical of all available larval controls. Death of the larvae usually occurs within 24 hours; allowing, when needed, a second treatment before the pupae stage is reached. The fast acting effectiveness of the Bti product allows technicians the ability 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 and is virtually non-toxic to all organisms aside from mosquito larvae.

2.5.2.2 *Bacillus sphaericus*

Bacillus sphaericus was registered in Canada June 1995. It is sold under the trade name VectoLex. The mode of action of this bacteria is similar to Bti as it produces toxins that attack the gut of mosquito larvae.

The benefits of *Bacillus sphaericus* are similar to those of Bti as it is virtually non-toxic to non-target organisms while being very effective and specific to mosquito larvae. This product works well when applied to highly organic larval habitats and has the added benefit of maintaining its effectiveness for up to 28 days, providing control of multiple generations of larvae with a single application. This product can be applied to any kind of standing water including, but not limited to, storm drains and detention/ seepage ponds.

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

Table 1. List of larvicide that are included in this PMP may be used within the Regional District Okanagan-Similkameen. Selection of the larvicide will be made by the applicator following assessment of the larval development habitat and available resources.

| Trade Name | Formulation | Active Ingredient | PCP No. | Application Rate | Application Method* |
|----------------------|-------------------------|---|---------|--|---------------------|
| Vectobac 200G | Granules | <i>Bacillus thuringiensis var israelensis</i> | 18158 | 3-10 kg/ha | ground or aerial |
| Aquabac 200G (5/8) | Granules | <i>Bacillus thuringiensis var israelensis</i> | 26863 | 2.5-20 kg/ha | ground or aerial |
| Aquabac 200G (10/14) | Granules | <i>Bacillus thuringiensis var israelensis</i> | 27374 | 0.5-1.0 mL of product per m ² | ground or aerial |
| VectoLex WSP | 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 ² of water surface area in tires | ground or aerial |

*Ground applications may be done by hand and/or with blowers. Aerial applications will 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. The decision will be based on a combination of 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);
- 4) the availability of the larvicide;
- 5) the cost of the larvicide; and

- 6) the proximity to fish-bearing water and the likelihood of intermittent connection to fish-bearing water.

The applicator must then decide which treatment method to use. In smaller sites, hand application may be used to spread granular larvicide. In larger sites, a backpack blower may be preferred as this equipment can blow granules to greater distances and cuts down on the amount of walking an applicator may have to do. Blowers can also be used to blow larvicide over water too deep for an applicator to wade in.

Finally, aerial application is a component of the RDOS Mosquito Control Program. 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 ground water levels peak during spring freshet, huge areas of habitat often become active simultaneously and mosquito control staff is unable to treat all larvae before they pupate. Aerial control is an excellent choice in this circumstance as a broader area of larval development habitat can be treated during each flight.

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 work best at each site. Constant evaluation of a program and its results will allow RDOS staff to improve and refine the 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 RDOS pesticide applicators will conduct and record all pre-treatment dips with

monitoring. Monitoring is done by certified applicators who return to the larval development site to conduct post-treatment checks using the same methods of assessing larvae 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 for that particular site.

3 Operational Information

The following sections describe the RDOS'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 *Handbook for Pesticide Applicators and Dispensers*, 5th Ed. (Ministry of Environment, 2005).

3.1 Procedures for Safely Transporting Pesticides

The following procedures for safely transporting pesticides will be practiced by all RDOS staff 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 it was originally packaged and with the label originally affixed by the manufacturer, or in a container designed for containing the pesticide and labeled accordingly. 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 Handbook for Pesticide Applicators and Dispensers, 5th Ed. (Ministry of Environment, 2005) outlines a number of general precautions to be taken during transport of pesticides, and the RDOS will adhere to the following practices:

- 1) all pesticide containers will be inspected for defects prior to transporting;
- 2) chemical pesticides will not be transported in the passenger compartment of any vehicle;
- 3) pesticides will never be transported along with food, feed or consumer goods;
- 4) chemical pesticides will not be transported on wooden truck beds as it is difficult to clean wood in the case of a spill, and future items carried in the truck could become contaminated;
- 5) all pesticide containers will be secured to prevent spillage;
- 6) the driver of any vehicle transporting pesticides will be trained in spill clean-up and will carry, along with the pesticides, necessary equipment to clean up the spill properly;
- 7) pesticides shall be carried in a secure lockable compartment such as a locked storage box or canopy; and
- 8) pesticides shall be transported separately from food and drinking water, safety gear and people.

3.2 Procedure for Safe Mixing, Loading and Applying Pesticides

The granular larvicide listed in this plan is in a ready to apply form, so no mixing is required. However, it is still prudent to follow the provincial recommendations for safe mixing, loading and applying pesticides. At the time of loading, a spill kit should be nearby. Emergency phone numbers and a telephone will be present. The person mixing the pesticide will wear protective clothing as listed on the product labels, which may include gloves, boots, face shield, and hat. Before

pesticides are applied, applicators will inspect all application equipment to ensure there are no leaks or needed repairs.

3.3 Procedures for Safely Storing Pesticides

The RDOS 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 it was originally packaged and with the label 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;
 - (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"; and
- 6) According to Section 31, the RDOS will inform the local fire department of the pesticide storage location within 60 days after starting to store pesticides.

3.4 Procedures for the Safe Disposal of Empty Pesticide Containers and Unused Pesticides

RDOS staff will dispose of empty containers (plastic/poly bags) as described on the manufacturer's product label. In the unlikely event that the RDOS 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

The RDOS uses granular pesticide, BTi and BTs, which requires gloves, a broom and a dust pan for clean-up in the event of a spill.

4 Environmental Protection Strategies & Procedures

The RDOS will follow the guidelines contained in the *Forest Practices Code of British Columbia Act*, *Integrated Pest Management Regulation* and the Handbook for Pesticide Applicators and Dispensers, 5th Ed. (Ministry of Environment, 2005).

4.1 Strategies to protect Water Sources and Community Watersheds

In order to protect domestic drinking water and water for agricultural use, the RDOS will strictly adhere to all standards for pesticide-free zones (PFZs) and no treatment zones (NTZs) as specified in the *Integrated Pest Management Act and Regulations*. Table 2 lists the PFZ's and NTZs for mosquito control applications.

The RDOS will follow the guidelines contained in the *Forest Practices Code of British Columbia Act* to protect community watersheds, and will ensure that each of the steps listed below are conducted:

- 1) The location of community watersheds will be determined by selecting the “Community Watersheds” layer on the provincial interactive mapping site “Online Cadastre”
- 2) An adequate buffer zone will be maintained around no-treatment zones;
- 3) No pesticides will be stored within a community watershed.

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 IPMR |
|----------------------------|---|--|------------------------------|
| Bacterial Larvicide | Water supply intake or well used for domestic or agricultural purposes, including water for livestock or for irrigation of 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) |

4.2 Strategies to Protect Fish and Wildlife, Riparian Areas and 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 provides cover for water bodies to help maintain cooler water temperatures.

With respect to pesticide applications, mosquito larvicide (as listed under this PMP) are of little concern. It is other *herbicides* that are generally considered the most dangerous pesticides in these ecosystems.

Due to the low toxicity of the bacterial larvicide, applications will be conducted within riparian areas, however care will be taken to keep impacts on vegetation and soil at a minimum (*e.g.* 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 or waters with continuous surface water connections with fish bearing waters. Finally, all maintenance and fueling of larviciding equipment will be done outside of the riparian areas.

4.3 Strategies to Prevent Contamination of Food Intended for Human Consumption

The larvicide 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 (*e.g.* applicator will wash hands before eating and food will be stored separately from pesticides and equipment used for larvicide application).

4.4 Pre-Treatment Inspection Procedures for Identifying Treatment Area Boundaries

Prior to larviciding, the applicator will consult maps and speak with landowners (or agency responsible for the land) to 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. **No larviciding** will take place on private land without the landowner's permission.

4.5 Procedures for Maintaining and Calibrating Pesticide Application Equipment

For granular larvicide, the applicator is responsible for determining if the application rate is within the label specifications. All hand, blower and helicopter applications are done using several factors including, weather, wind (estimating the spread pattern of the granules on the water surface) and then calculating the application rate of the product that was applied.

4.6 Procedures for Monitoring Weather Conditions and Strategies for Modifying Pesticide Application Methods for Different Weather Conditions

RDOS staff will monitor weather and environmental conditions prior to and during larviciding applications. All weather monitoring during the course of the application will be done on site. The applicator will determine whether or not they can accommodate for wind speed and still apply the larvicide effectively. Precipitation rarely interferes with ground application of larvicide; however, during heavy rain aerial applications may be stopped as water can cause the granules to clump in the application equipment and negatively affect application rates.

5 Records and Reporting

Under the *Integrated Pest Management Regulation*, the RDOS is 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 RDOS will maintain, for three years from the date of treatment, records of all pesticide applications including:

- 1) treatment location; added color coded GIS mapping covering several years
- 2) 'check-up ' monitoring;
- 3) treatment date and time;
- 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);
- 10) results of post-treatment monitoring and evaluation

5.2 Records of Larval Development Sites

The RDOS will maintain updated records of all larval development sites, including:

- 1) ArcGIS, GPS location and description of the location of the site including specialized site-specific notes and hazards;
- 2) name, address and phone number of owner or manager of the treatment site; and
- 3) information concerning no-treatment areas or areas where permission has not been granted by the landowner.

5.3 Annual Report of Pesticide Use

The RDOS will submit an Annual Report of Pesticide Use to the Administrator of the *Integrated Pest Management Regulation* by January 31 of every year, as summary of the previous calendar years use including:

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

5.4 Annual Notice of Intent to Treat

The RDOS will provide a Notice of Intent to Treat to the Administrator *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 these locations;
- 3) a description of the proposed treatment for each area, including the pesticide to be used and its method of application; and
- 4) the total area of treatment sites in the proposed treatment locations for the calendar year.

6 Consultation

The *Integrated Pest Management Regulation* specifies that the person 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 with individuals who have the potential to be affected by proposed pesticide used under the PMP. The Regional District completed all necessary consultations as described in the following sections.

6.1 Consultation Process

Public consultation with respect to this PMP will be conducted for a period of 12 weeks between October 29, 2022 to January 21, 2023. A newspaper advertisement (Appendix C) has been placed in newspapers throughout the Regional District and will print on two occasions in each newspaper within a two-week period (Table 3). The advertisement included all components in accordance with the *Integrated Pest Management Regulation*, including the statement that “persons 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 RDOS within 30 days of the publication of this notice.” In addition to the required advertisements in the local newspaper, the RDOS will include a copy of the advertisement on their website for the entire duration of the consultation period. The advertisement informed interest parties that the PMP may be viewed in hardcopy at the Regional District office, or electronically on the web at www.RDOS.bc.ca. At the date of PMP submission, there was no response to the public consultation process.

Copies of the draft PMP will be shared in both hardcopy and digital format to the Upper Similkameen Indian Band, the Lower Similkameen Indian Band, the Osoyoos Indian Band and the Penticton Indian Band on or before November 15, 2022. Accompanying letters will invite these First Nation groups to provide information, request a meeting or express concerns they may have with respect to this PMP and its potential effects on their traditional lands, aboriginal rights, treaty rights, or cultural values (Appendix E). The consultation process has been extended to Mar. 15th to allow for review by Osoyoos Indian Band. No response was submitted prior to the submission date. Penticton Indian Band completed the consultation process and submitted a response on Apr 19, 2023 that denied approval of the plan. An invitation to review and discuss concerns associated with the plan has received no response.

Table 3. Newspapers and publishing dates of the RDOS notifications of the development of a pest management plan (Appendix C) for mosquito control.

| Name of Newspaper | First Publishing Date | Second Publishing Date |
|-----------------------------------|-------------------------|--------------------------|
| Keremeos Review | Thurs, November 3, 2022 | Thurs, November 10, 2022 |
| Penticton Western | Wed, November 2, 2022 | Wed, November 9, 2022 |
| Oliver Chronicle | Thurs, November 3, 2022 | Thurs, November 10, 2022 |
| Osoyoos Times | Thurs, November 3, 2022 | Thurs, November 10, 2022 |
| Penticton Herald | Sat, October 29, 2022 | Sat, November 5, 2022 |
| Similkameen Spotlight (Princeton) | Thurs, November 3, 2022 | Thurs, November 10, 2022 |
| Summerland Review | Thurs, November 3, 2022 | Thurs, November 10, 2022 |

6.2 Public Response to the Proposed PMP

This section will be updated following the completion of the 12 week consultation process.

General Public: No responses

First Nations Consultation Process: Extension request received from OIB, notified all bands of extension to March 15, 2023.



extension to PMP Consultation and review period

To Shelley Fiorito

Bcc yferrals@pib.ca; yferrals@usb.ca; yferrals@tsb.net

Good Morning,

I have received a request for a 60 day extension to the review period for the RDOS Pest Management Plan for the Mosquito Control Program. Please note that the new deadline for comments has been extended to March 15, 2023.

I am available via phone, email and in-person for discussions about any aspects of the Mosquito Control Program and the draft Pest Management Plan that was distributed late November of last year.

Thank you in advance for your time and consideration and I look forward to your comments.



Shelley Fiorito • Project Coordinator I – Utilities
 RDOS Community Coordinator - WildsafeBC
 Regional District of Okanagan-Similkameen
 101 Martin Street, Penticton, BC V2A 5J9
 p. 250-490-4110 • tf. 1-877-610-3737 • f. 250-492-0063
www.rdos.bc.ca • sfiorito@rdos.bc.ca

[FACEBOOK](#) • [YOUTUBE](#) • Sign up for [REGIONAL CONNECTIONS](#)

A request was received via email from PIB (see below) on March 17, 2023 with specific questions related to the plan.



Penticton Indian Band
Natural Resources Department
841 Westhills Drive | Penticton, B.C.
V2A 0E8
Referrals@pib.ca | www.pib.ca
Telephone: 250-492-0411
Fax: 250-493-2882

Project Name:
RDOS Pest Management Plan Renewal - Mosquito Control

FN Consultation ID:
L-230209-RDOS-MOS-PMP-23/28

Consulting Org Contact:
Shelley Fiorito

Consulting Organization:
[Regional District of Okanagan Similkameen](#)

Date Received:
Thursday, February 9, 2023

File number:
RDOS-MOS-PMP-23/28

Proponent Organization:

Proponent Contact:

March 17, 2023

Attention: Shelley Fiorito and

The Penticton Indian Band acknowledges receipt of your referral dated The PIB has insufficient information to begin review of your referral. The PIB makes information based decisions. Please provide the information indicated below.

1. Please provide current research regarding the potential effects of the proposed activity on wildlife including amphibians, avian species and species at risk.
2. Please provide more detailed information regarding the "riparian buffers" you plan to employ
3. Please provide more detailed information with respect to how riparian areas are identified (e.g are NCD's considered riparian areas?)
4. Please provide information with respect to potential impacts to aquatic species were the pest management controls to enter a watercourse (e.g. a rainfall event following pest management control application).

Without this information, we cannot make an informed decision and we would have no other alternative but to reject the proposed activity/development. We look forward to your response.

Please note that our participation in the referral and consultation process does not define or amend PIB's Aboriginal Rights and Title, or limit any priorities afforded to Aboriginal Rights and Title, nor does it limit the positions that we may take in future negotiations or court actions.

Please contact me to discuss.

limlamt,

RDOS Response is below:

 Tue 2023-03-28 2:34 PM
Shelley Fiorito
RE: RDOS Pest Management Plan Renewal - Mosquito Control

To 'referrals@pib.ca'

| | |
|--|--|
|  BTI_Study_France.pdf 1 MB |  SDS-VBC-0020R5-VectoBac-G-01-03-20-1.pdf 228 KB |
|--|--|

Hi Maryssa,

I have attached a study that was conducted in France over 4 years and multiple field sites to assess the impact of BTi and non-target invertebrates. I have also included the Safety Data Sheet for the larvicide used within the RDOS control program. Although there are identified minor effects of mosquito control on the Food web, there is also the benefit of contributing to the biomass in the waterbody as opposed to having the larvae pupate and fly off. The intention of the program is to balance the comfort of residents, livestock, visitors and pets spending time outdoors in the Okanagan, and the environmental impacts of the product we apply. There is not the expectation to eradicate the population of mosquitoes, but rather to reduce the population to a tolerable level.

As far as riparian buffers are concerned, treatment is conducted in stagnant water, so there are no buffer zones applied. The directive of our program is to be as efficient and cost-effective as possible, so our technicians are very cognisant of ensuring the product is applied at the appropriate application rates and that waste is minimized. The target habitat for treatment is stagnant, non fish bearing waterbodies on private property where landowners have requested service. We are not permitted to apply BTi to flowing or fish bearing waterbodies. The RDOS has also implemented a monitoring program as well as threshold limits for treatment. This ensures that treatment only occurs when there is an identified presence of larvae in the sample.

I trust that this addresses the outstanding questions related to the Pest Management Plan and that the review process can proceed.

I look forward to your response,

 **Shelley Fiorito** • Project Coordinator I – Utilities
RDOS Community Coordinator - WildsafeBC
Regional District of Okanagan-Similkameen
101 Martin Street, Penticton, BC V2A 5J9
p. 250-490-4110 • tf. 1-877-610-3737 • f. 250-492-0063
www.rdos.bc.ca • sfiorito@rdos.bc.ca
FACEBOOK • YOUTUBE • Sign up for [REGIONAL CONNECTIONS](#)

On April 19, 2023 PIB returned their response to the draft Pest Management Plan voicing concerns with impacts and denying approval for the plan.



Penticton Indian Band
Natural Resources Department
841 Westhills Drive | Penticton, B.C.
V2A 0E8
Referrals@pib.ca | www.pib.ca
Telephone: 250-492-0411
Fax: 250-493-2882

Project Name:

RDOS Pest Management Plan Renewal - Mosquito Control

FN Consultation ID:

L-230209-RDOS-MOS-PMP-23/28

Consulting Org Contact:

Shelley Fiorito

Consulting Organization:

[Regional District of Okanagan Similkameen](#)

Date Received:

Thursday, February 9, 2023

File number:

RDOS-MOS-PMP-23/28

April 19, 2023

Attention: Shelley Fiorito and

The Penticton Indian Band (PIB) acknowledges receipt of your referral dated 2020-07-06. The syilx (Okanagan) Nation holds unextinguished aboriginal title and rights to the land and resources within our Territory. Our lands and our jurisdiction over our lands have never been ceded. The above-noted activity/development is within syilx territory and PIB's Area of Interest. All activities on the land are subject to syilx nation Title, jurisdiction, Rights, interests, decision making and responsibility.

The Penticton Indian Band has now had the opportunity to review the proposed activity. The PIB has concerns as pest management in the form of mosquito control is not recognized under our syilx management standards. It is not in the interest of the syilx/PIB to artificially modify the lands and waters by the use of insecticides. The syilx people have successfully managed these lands since time immemorial and that does not include the use of insecticides or pest management programs. In addition, the provincial watercourse differs from syilx standards, every body of water including cacwix (NCD's) are meaningfully managed and we are uncertain of the impacts of these sacred water spaces. Furthermore, the PIB was not consulted during the development of Integrated Pest Management Act and Regulations and they do not represent our syilx way of managing lands. We have engaged with syilx elders and we don't feel we know the short-term and long-term impacts of our syilx relatives-land, animals, water. This process is not approved by PIB and we cannot support at this time.

Please note that our participation in the referral and consultation process does not define or amend PIB's Aboriginal Rights and Title, or limit any priorities afforded to Aboriginal Rights and Title, nor does it limit the positions that we may take in future negotiations or court actions.

If you require further information or clarification, please do not hesitate to contact me.

simlamt,

Maryssa Bonneau

A request for engagement and discussion was made on April 21, 2023.

RDOS Nuisance Mosquito Control Pest Management Plan 2023-2028



Fri 2023-04-21 10:38 AM

Shelley Fiorito

RDOS Pest Management Plan 2023-2028

To yeferrals@pib.ca

Cc [Lisa Bloomfield](#)

Good Afternoon Maryssa,

I have received the response to the consultation by the PIB and was wondering if there is an opportunity to meet and address some of the concerns noted. I would be happy to participate in a presentation followed by a discussion to alleviate any concerns. My hope is that there is a path forward that includes a respectful and inclusive First Nation directive that will influence how our Mosquito Control Program approaches treatment moving forward.

I look forward to hearing from you.



Shelley Fiorito • Project Coordinator I – Utilities
RDOS Community Coordinator - WildsafeBC
Regional District of Okanagan-Similkameen
101 Martin Street, Penticton, BC V2A 5J9
p. 250-490-4110 • tf. 1-877-610-3737 • f. 250-492-0063
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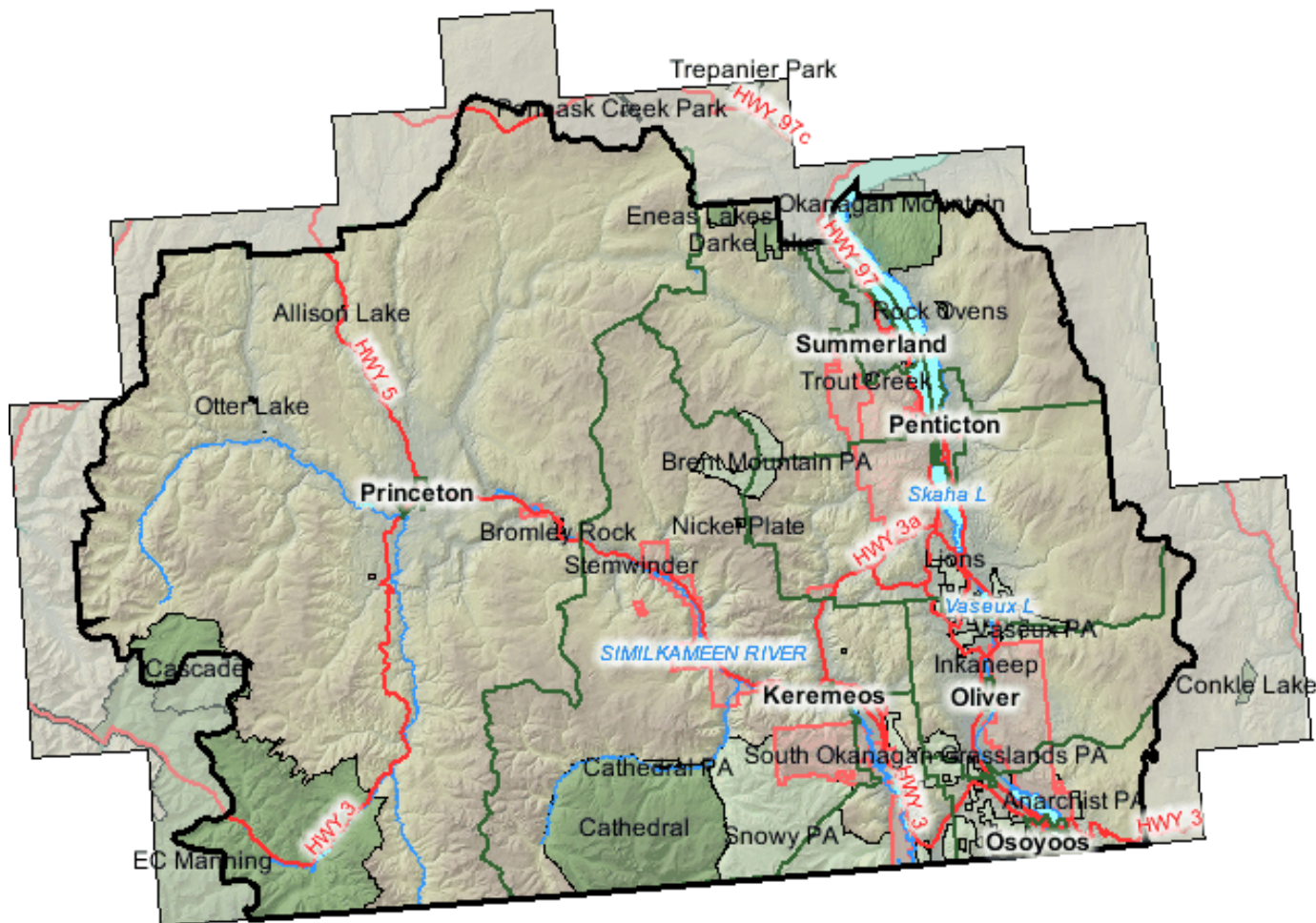
I acknowledge that I work within the traditional, unceded territory of the syilx people in the Okanagan Nation.

This Communication is intended for the use of the recipient to which it is addressed, and may contain confidential, personal and/ or privileged information. Please contact the sender immediately if you are not the intended recipient of this communication and do not copy, distribute or take action relying on it. Any communication received in error, or subsequent reply, should be deleted or destroyed.

There has been no response to date.

As we approach the expiry of the existing PMP, we feel we have provided sufficient time for input regarding the Pest Management Plan for 2023-2028. We respectfully submit the plan as is for approval.

Appendix A: Map of the Geographic Boundaries that apply to this PMP



The above map shows the boundaries of the Regional District of the Okanagan-Similkameen. Maps detailing the locations of known larval development sites can be viewed at the Regional District Okanagan-Similkameen office.

Appendix B: Checklist of Required Information for the Development of a Pest Management Plan (from Section 58 if the *Integrated Pest Management Regulation*)

Checklist for required contents of a Pest Management Plan (from Section 58 of the *Integrated Pest Management Regulation*).

| | Section of IPMR | Task | Associated Section Within this PMP |
|-------------------------------------|------------------------|--|---|
| <input checked="" type="checkbox"/> | 58 1(a) | Description of geographic boundaries with maps etc. | Section 1.1, Appendix A |
| <input checked="" type="checkbox"/> | 58 1(b) | Person responsible for managing pests in relation to land described above | Section 1.2 |
| <input checked="" type="checkbox"/> | 58 1(c) | Principal contact for information | Section 1.2 |
| <input checked="" type="checkbox"/> | 58 2(a) | Description of the program to prevent organisms from becoming pests | Section 2.1 |
| <input checked="" type="checkbox"/> | 58 2(b) | Description of pest identification or techniques for pest identification | Section 2.2 |
| <input checked="" type="checkbox"/> | 58 2(c)i | Description of monitoring methods of environment and target population before and during pesticide use | Section 2.3 |
| <input checked="" type="checkbox"/> | 58 2(c)ii | Description of monitoring frequency of above before and during pesticide use | Section 2.3 |
| <input checked="" type="checkbox"/> | 58 2(c)iii | Collected data of 2(c)i before and during pesticide use | Section 2.3 |
| <input checked="" type="checkbox"/> | 58 2(d)i | Treatment threshold and description of how it was chosen | Section 2.4 |
| <input checked="" type="checkbox"/> | 58 2(d)ii | how treatment threshold will be applied | Section 2.4 |
| <input checked="" type="checkbox"/> | 58 2(e)i | Description of all possible treatment methods | Sections 2.5.1, 2.5.2, |
| <input checked="" type="checkbox"/> | 58 2(e)ii | Rational for treatment selection | Sections 2.5.1, 2.5.2, |
| <input checked="" type="checkbox"/> | 58 2(e)iii | Benefits and limitations for each possible method under sec 2(e)i | Sections 2.5.1, 2.5.2, |
| <input checked="" type="checkbox"/> | 58 2(e)iv | Description of how treatment method chosen | Section 0 |
| <input checked="" type="checkbox"/> | 58 2(f)i | Description of monitoring methods of pesticide efficacy and environmental effects | Section 0 |
| <input checked="" type="checkbox"/> | 58 2(f)ii | Description of frequency of monitoring of above | Section 0 |
| <input checked="" type="checkbox"/> | 58 2(f)iii | Description of data collected for 2(f)i | Section 0 |
| <input checked="" type="checkbox"/> | 58 3(a)i | Procedures for safely transporting pesticides | Section 3.1 |
| <input checked="" type="checkbox"/> | 58 3(a)ii | Procedures for safely storing pesticides | Section 3.3 |
| <input checked="" type="checkbox"/> | 58 3(a)iii | Procedures for safely mixing, loading, and applying pesticides | Section 3.3 |
| <input checked="" type="checkbox"/> | 58 3(a)iv | Procedures for the safe disposal of empty pesticide containers and unused pesticides | Section 3.4 |

| | | | |
|-------------------------------------|------------|---|-------------|
| <input checked="" type="checkbox"/> | 58 3(a)v | Procedures for responding to pesticide spills | Section 3.4 |
| <input checked="" type="checkbox"/> | 58 3(b)i | Strategies to protect water sources and community watersheds | Section 4.1 |
| <input checked="" type="checkbox"/> | 58 3(b)ii | Strategies to protect fish, wildlife, riparian areas & wildlife habitat | Section 4.2 |
| <input checked="" type="checkbox"/> | 58 3(b)iii | Strategies to prevent human food contamination | Section 4.3 |
| <input checked="" type="checkbox"/> | 58 3(b)iv | Pre-treatment procedures for identifying treatment area boundaries | Section 4.4 |
| <input checked="" type="checkbox"/> | 58 3(b)v | Procedures for calibrating application equipment | Section 4.5 |
| <input checked="" type="checkbox"/> | 58 3(b)vi | Procedures for monitoring weather conditions | Section 4.6 |

Appendix C: Copy of the advertisement published in local newspapers (Table 3) between October 29, 2022 and November 17, 2022



DEVELOPMENT OF A PEST MANAGEMENT PLAN

Pest management Plan Number:
RDOS-MCP-PMP-2023/2028

Applicant: Regional District of Okanagan-Similkameen (RDOS)
101 Martin Street, Penticton, BC V2A 5J9. Tel: 250-490-4110
Attn: Shelley Fiorito

Notice is given that a draft Pest Management Plan has been prepared by the applicant to provide nuisance mosquito control using the principles of integrated pest management.

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

The selection of the granular insecticides have been chosen to target mosquito populations in the most environmentally responsible manner available.

Pesticides: The active ingredients and trade names of the pesticides used under this plan include:
Bacillus thuringiensis israelensis: Vectobac 200G, Aquabac 200G.
Bacillus sphaericus: Vectolex WSP, Vectolex CG.

Location: Within the boundaries of the Regional District of Okanagan-Similkameen including the Municipalities of Penticton, Oliver, Osoyoos, Summerland and Electoral Areas "A", "B", "C", "D", "F", "G" and "H" under Bylaw # 2658, 2014. Treatments will be conducted on public, private and crown lands within the above listed municipalities and electoral areas.

The proposed duration of the PMP is from May 18, 2023 to May 18, 2028.

A draft copy of the PMP and maps of the potential treatment sites can be examined in detail at the RDOS main office at the above listed address. The draft PMP can also be viewed on the RDOS website at: www.rdos.bc.ca

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 E: Sample Letter sent to First Nation groups requesting input concerning this PMP – Four Bands within RDOS Boundaries.



Nov 3, 2022

File No: 5260.20

Chief Crow and Council
Band Administrator
Lower Similkameen Indian Band
PO Box 100,
Keremeos, BC V0X 1N0

Dear Chief Crow and Council:

Re: RDOS Pest Management Plan 2023 – 2028

The Regional District of Okanagan-Similkameen has been treating nuisance mosquitos in the region for twenty-eight years. Every five years, the Province requires the RDOS to provide (renew) a Pest Management Plan for the control of nuisance mosquitoes within the Regional District.

The RDOS Mosquito Control Program takes place annually between April and early September. There are approximately 450 private landowners whose properties experience ephemeral standing bodies of water too large for them to drain, or areas traditionally inundated by ground water long enough to produce nuisance mosquitos.

This letter introduces the consultation process of the Plan, with our neighbouring Indian Bands, and a regional public consultation. The Proposed Plan (No. RDOS-MCP-PMP-2023/2028) in draft form is included in this package, as are maps showing the treatment areas in 2021 and 2022 (an exceptionally year for flooding). The maps provided are on the thumb drive – USB stick, enclosed, due to their size. To be able to enlarge and zoom in, the maps of treatment areas can also be viewed on:

The RDOS welcomes the opportunity to discuss this program with you, in person at your location. In addition to this, in accordance with the Ministry of the Environment, we are required to ask you the following questions:

With the depth of your traditional knowledge and longstanding occupancy of the lands covered by this application, do you feel there would be:

- a. any negative affects to your traditional activities?
- b. any negative affects to your traditional programs?

If you would like submit information, comments or concerns pertaining to the plan, please do so in writing by Jan 15th, 2023. If you would like to discuss this, or prefer to offer comments in person, please contact Shelley Fiorito, Project Coordinator, Regional District of Okanagan-Similkameen (250) 490-4110. Shelley will follow up with a second letter and phone call before the 15th



REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
101 Martin Street, Penticton, BC V2A 5J9 | 250-492-0237 | www.rdos.bc.ca | info@rdos.bc.ca
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of January. If we have not heard from you by Jan 15th 2023, we will proceed under the assumption that your community has no opposition to our Plan.

If you would like to speak to a Ministry representative directly about the proposed pesticide use outlined in this letter, please contact the following Regional Office:

Sr. Pesticide Management Officer - Scott Bennett
BC Ministry of Environment and Climate Change Strategy
Tel. (236) 468-2250

Or, contact:
RDOS Mosquito Control Program Supervisor
Shelley Florito
101 Martin Street,
Penticton BC V2A 5J9
Tel. (250) 490-4110
sflorito@rdos.bc.ca

Yours Truly,

Lisa Bloomfield,
Manager of Utilities

cc: Ministry of Environment, Penticton BC Office
|

DRAFT

7 Appendix F - Sample Letter sent to First Nation groups requesting input concerning this PMP – from CAD identified Bands, First Nations and Tribal Councils



November 3, 2022

File No: S260.20

Individual Addressee

Dear Chief and Council:

Re: Regional District Okanagan Similkameen Pest Management Plan 2023 – 2028

The Regional District of Okanagan-Similkameen (RDOS) has been treating nuisance mosquitos in the region for twenty-eight years. Every five years, the Province requires the RDOS to provide (renew) a Pest Management Plan for the control of nuisance mosquitoes within the Regional District.

The RDOS Mosquito Control Program takes place annually between March and September. There are approximately 450 private landowners whose properties experience ephemeral standing bodies of water too large for them to drain, or areas traditionally inundated by ground water long enough to produce nuisance mosquitos. These lands are already disturbed and altered lands such as farms or residential holdings. As far back as records allow, (late 90's) the RDOS has been using the granular larvicide BTI, a biological control under the names Vectobac or Aquabac.

This letter introduces the consultation process of the RDOS Pest Management Plan with our neighbouring Indian Bands (fully underway), Bands or Tribes featured on the Provincial Consultative Areas Data Base, as well as regional public consultation (underway).

The Proposed Plan (No. RDOS-MCP-PMP-2023/2028) in draft form is included in this package. The maps provided identifying treatment areas are included as a link, due to their size. To be able to enlarge and zoom in, the maps of treatment areas can also be viewed on:

Included is a map of the Regional District of Okanagan-Similkameen.



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Cont.

The RDOS welcomes the opportunity to discuss this program with you. In addition to this, in accordance with the Provincial protocols, we are required to ask you the following questions:

With the depth of traditional knowledge and longstanding occupancy of the lands covered by this application, do you feel there would be:

- a. any negative affects to your traditional activities?
- b. any negative affects to your traditional programs?

If you would like to submit information, comments or concerns pertaining to the plan, please do so in writing by Jan 15th, 2023. If you would like to discuss this, please contact Shelley Fiorito, RDOS Project Coordinator, at (250) 490-4110. Shelley will follow up with a second letter and phone call before the 15th of January. If we have not heard from you by January 15th, we will proceed under the assumption that your community has no opposition to our Plan.

Throughout the term of the PMP, we continue to welcome the opportunity to meet with a representative from your community to engage in an information sharing exchange. We are available to participate in any dialogue through meetings, teleconference, or in writing. Please feel free to contact Shelley Fiorito at the contact options below.

If you would like to speak to a Ministry representative directly about the proposed pesticide use outlined in this letter, please contact the following Regional Office:

Sr. Pesticide Management Officer - Scott Bennett
BC Ministry of Environment and Climate Change Strategy
Tel. (236) 468-2250

Or, contact:
RDOS Mosquito Control Program Supervisor
Shelley Fiorito
101 Martin Street,
Penticton BC V2A 5J9
Tel. (250) 490-4110
sfiorito@rdos.bc.ca

Yours Truly,

Per Lisa Bloomfield,
Manager of Utilities

cc: Ministry of Environment, Penticton BC Office