

FACT SHEET

for the

Formal Draft Aquatic Mosquito Control NPDES General Permit

National Pollutant Discharge Elimination System and
State Waste Discharge General Permit

Formal Draft released on
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State of Washington
Department of Ecology
Olympia, Washington 98504

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EXECUTIVE SUMMARY

Under the authority of Chapter 90.48 Revised Code of Washington (RCW), the Washington State Department of Ecology (Ecology) proposes to reissue the Aquatic Mosquito Control National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit (Mosquito General Permit, permit) to protect Waters of the State. The permit conditionally authorizes discharges of larvicides and indirect discharges of adulticides to surface Waters of the State of Washington.

Ecology proposes to issue the revised permit so that dischargers operating under coverage of this permit will comply with the Federal Clean Water Act (CWA) (33 U.S.C. §1251 et seq.) and with the Washington Water Pollution Control Act, Chapter 90.48 RCW. The draft permit does not authorize a violation of surface water quality standards or the violation of any other applicable local, state, or federal laws or regulations. The permit requires that Permittee notify the public, post signs at treatment sites, conduct monitoring, and provide annual treatment reports to Ecology.

This fact sheet is a companion document to the 2019 draft Aquatic Mosquito Control General Permit. It explains and documents:

- The decisions made by Ecology while developing the draft permit.
- The regulatory and technical basis for Ecology's decisions.
- The nature of the proposed discharges conditionally authorized by the permit.
- The legal and technical basis for permit issuance required in Section 110 of Chapter 173-226 WAC (Washington Administrative Code, also written as WAC 173-226-110).

The challenge of this permit is striking a balance between the health of the environment, human health, and meeting federal and state regulatory requirements. Since the *Headwaters, Inc. v. Talent Irrigation District* Ninth Circuit Court decision, Ecology has maintained that coverage under a NPDES permit is required before discharging pesticides to Waters of the State.

Since 2002, Ecology has issued coverages under general and individual NPDES permits for discharges of aquatic pesticides and other chemicals. In 2009, the Sixth Circuit Court ruled in *National Cotton Council et al. v. The Environmental Protection Agency (EPA)* that the discharge of pesticides and their residues to Waters of the State requires coverage under a NPDES permit. This decision means that NPDES permitting is required for all aquatic pesticide applications throughout the United States.

In 2016, the EPA developed a general NPDES permit for this purpose (effective October 31, 2016). In Washington, the EPA permit covers aquatic pesticide applications on:

- Federal lands when the federal government is the decision-maker.
- Tribal Lands, except for portions of the Puyallup Reservation.

Ecology proposes revisions to the Mosquito General Permit to update reporting requirements, improve the readability of the permit, and to include an active ingredient—deltamethrin—requested by Permittees. As required by WAC 173-226, the draft permit, fact sheet, application

for coverage, SEPA documents, and the Economic Impact Analysis are available for public review and comment from March 6, 2019 until April 19, 2019. Details about how to prepare and submit comments are included in Section 6.0 of this Fact Sheet. For more information about the public process, see Section 6.0.

After the public comment period closes, Ecology will summarize and respond to substantive comments. Ecology may change the proposed terms, limits, and conditions contained in the draft permit based on comments and testimony received during the public comment period. Ecology will include the responses and the comments as an appendix to this fact sheet. Ecology will **not** revise this fact sheet besides including the response to comments as an appendix.

Ecology intends to issue the final permit in the summer of 2019.

1.0 INTRODUCTION

The Washington State Legislature (Legislature) gave Ecology the authority to control and prevent the pollution of Waters of the State, as stated in the Water Pollution Control law, Chapter 90.48 RCW (Revised Code of Washington). The Legislature also required that industrial and commercial facilities that discharge waste to Waters of the State (including ground water) have a permit. Over the past 40 years, Ecology has issued more than 15,000 individual permits to numerous industrial and commercial facilities. Ecology has also issued 24 general permits since 1992 and has issued coverage under those general permits to more than 6,000 facilities.

Since 2001, based on *Headwaters v. Talent Irrigation District*, Ecology has issued NPDES permit coverages for the discharge of pesticides to Waters of the State. Eight years later, in 2009, the Sixth Circuit Court decided that NPDES permits are required for all aquatic pesticide applications throughout the United States.

The draft permit covers the discharge of larvicides and the incidental discharge of adulticides to waterbodies in Washington. Ecology may issue coverage under a general permit or an individual permit to an individual discharger. An individual permit may be necessary when mosquito control activities or treatment sites are not typical of the industrial group or they warrant requirements tailored to their specific situation.

However, when an entire class of discharges has similar characteristics, coverage under a general permit may be more appropriate. A general permit is designed to provide environmental protection under conditions typical for the covered industrial group. It allows a unified approach to similar activities and can simplify the permitting process, saving the discharger and Ecology time and resources.

The establishment of a general permit for discharges from mosquito control activities is appropriate because:

- The characteristics of discharges from mosquito control activities are similar.
- A standard set of permit requirements can effectively provide environmental protection.
- Dischargers in compliance with permit conditions will be in compliance with water quality standards.
- A general permit is the most efficient method to handle the large number of mosquito control entities in Washington State.
- The application requirements for coverage under a general permit are far less rigorous than individual permit application requirements and are more cost effective.

Ecology may require individual permits where a proposed activity requires additional guidance, or when an individual Permittee requests an individual permit and Ecology agrees to develop and issue one.

This fact sheet explains the nature of the proposed discharges, Ecology's decisions on limiting the pollutants in the receiving water, and the legal and technical basis for these decisions.

2.0 INDUSTRY OVERVIEW

2.1 General Information about Mosquitoes

Mosquitoes are small flying insects that have a slender segmented body, three pairs of long legs, a pair of wings, feathery antennae, and elongated mouthparts. There are roughly 3,500 species of mosquitoes in the world and more than 200 species in the United States. Their scientific classification is included below.

Kingdom = Animalia (Animals)
Phylum = Anthropoda (Anthropods)
Class = Insecta (Insects)
Order = Diperta (Flies)
Family = Culcidae (Mosquitoes)

(Information sources: (Wikipedia. 2019-02-07) (Bug Guide. 2019-02-07)

The following six (6) genera of mosquitoes are found in Washington State.

- *Aedes*
- *Anopheles*
- *Coquilletidia*
- *Culex*
- *Culiseta*
- *Ochlerotatus*

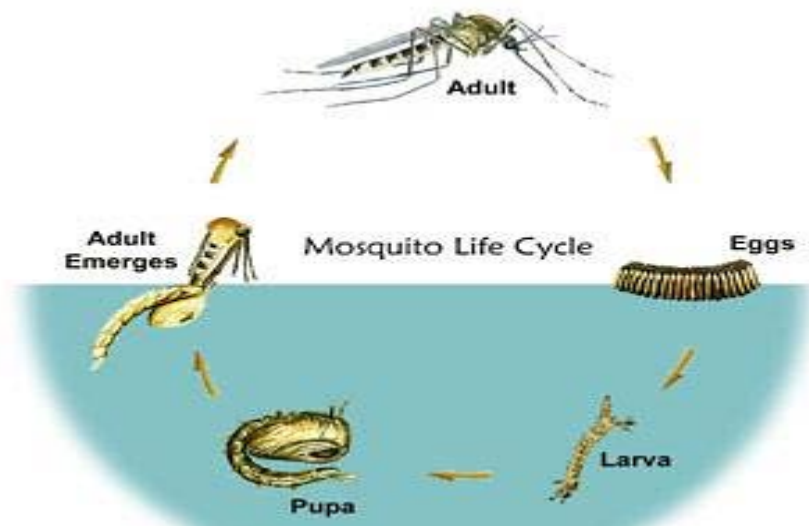
Mosquito Life Cycle

The highly variable mosquito life cycle ranges from one to three weeks, depending on factors such as water temperature and food availability. Mosquitoes will breed wherever water can support their larvae. Only a very small amount of water (such as the amount trapped in a tire, tin can, or hoof print) is necessary to support successful maturation of mosquitoes. Warmer water can speed up the development of mosquito larvae.

Mosquitoes either lay eggs in masses or rafts on the water surface, or deposit their eggs on moist substrates that will later be flooded with water. Mosquito eggs take 24 to 48 hours to develop and hatch. However, the eggs that are deposited on moist substrates may sometimes last for months before they hatch, due to flooding of the moist area.

Mosquitoes undergo a complete metamorphosis, which involves four (4) stages of development: egg, larva, pupa, and adult. **See Figure 1 – Mosquito Life Cycle.** The female mosquito lays the eggs directly on water in “rafts” or on moist substrates. The egg hatches into larva, or “wigglers.” During the larval stages, a mosquito feeds and goes through four growth stages called instars. When the larva reaches the fourth instar, it stops feeding and pupates. During the pupa stage, the larva rests and undergoes the many internal changes necessary to mature into an adult mosquito. This period lasts a few hours to a few days, after which an adult mosquito emerges from the pupa.

FIGURE 1
MOSQUITO LIFECYCLE



(Information source: EPA (2019-02-07))

Adult mosquitoes are most active from dusk until dawn when they search for a meal and a mate. Nectar and other plant juices make up most of the adult mosquitoes' diet. Only female mosquitoes need a blood meal. They need the blood to produce eggs. After the female mosquito takes a blood meal, she deposits her eggs, and the cycle continues.

Disease Transmission by Mosquitoes

To develop eggs, female mosquitoes of nearly all species require a blood meal (for protein) from vertebrate animals. Several species of mosquito will take blood from humans. When humans act as a blood-meal host for mosquitoes, the mosquitoes can transmit various diseases to the humans.

In order for a mosquito to transmit a disease to humans, it must first take a blood meal from a host that is carrying a transmittable disease. Most of these hosts are birds and small mammals, making them important to the amplification of diseases in the environment. After taking a blood meal from an infected bird or animal, the mosquito may bite a human, transferring the disease to the human in its saliva. West Nile Virus (WNV) is a good example of this mode of transmission.

Diseases transmitted by mosquitoes and other insects are known as arthropod-borne viruses (arboviral diseases). Globally, the diseases transmitted by mosquitoes to humans include WNV, encephalitides, dengue, yellow fever, malaria, and filariasis. Other pathogens transmitted by mosquitoes include *Dirofilaria immitis*, a parasitic roundworm and the causative agent of dog heartworm. Some of these diseases have been endemic or epidemic diseases in the United States in the past. Today, encephalitides and WNV are the arbovirals most commonly reported. Dengue occurs periodically in the United States, but it mostly occurs in the far South.

Public Health Impacts from Mosquitoes

At this time, the only endemic diseases known to occur in Washington include the WNV, St. Louis Encephalitis (SLE), and Western Equine Encephalitis (WEE), according to comments from the Washington State Department of Health (DOH). These diseases can cause serious, sometimes fatal, neurological ailments in humans. The WEE virus can also affect horses. Birds and small mammals are typically infected by these viruses. As the number of birds and small mammals increases, the spread of infection is amplified and can spread more rapidly to humans via mosquitoes.

Infections from the WEE virus tend to be more serious in infants, while the SLE virus can be more serious for the elderly. The WNV can infect anyone, but the elderly and individuals with compromised immune systems have the highest probability of developing a severe form of the disease.

The WNV was originally found in the northeastern United States in 1999. In Washington, the first reports of the WNV occurred in 2006. Since then, 109 human cases of WNV have been reported, and 66 of those cases were reported as WNV neuroinvasive disease. One death occurred due to the neuroinvasive form of WNV in 2009⁽¹²⁾.

Even if mosquitoes do not transmit disease when they bite, mosquito bites can cause other effects such as irritation, redness, itching, pain, secondary infections, and allergic reactions. Ecology did not find statistics for allergies to mosquito bites. However, an article in the *Journal of Allergy and Clinical Immunology* by the Joint Council of Allergy Asthma and Immunology, lists life threatening allergies to stinging insects (bees, wasps, and ants) as affecting 0.4-0.8 percent of children and 3 percent of adults^(42,43). It is possible that mosquito allergies occur with similar frequency.

2.2 Mosquito Control

Mosquito control programs are important to public health. State and local governments, health departments, and vector or mosquito control districts are responsible for managing mosquito control activities. There are approximately 16 mosquito control districts (MCDs) in Washington State. Some MCDs are small and are responsible for mosquito abatement in areas covering a few hundred square miles. Other MCDs are responsible for controlling mosquitoes over entire counties.

Modern mosquito control programs in the United States are multifaceted and include surveillance, source reduction, and a variety of methods to control larval and adult mosquitoes.

Integrated Pest Management

Public agencies can best manage mosquito populations on an area-wide basis by using integrated pest management. The Legislature requires all state agencies responsible for pest control to follow the principles of integrated pest management ([RCW 17.15.005](#)).

Integrated pest management (IPM) is an approach that involves coordinating efforts and making decisions to control pests in an environmentally and economically effective manner (RCW

17.15.010). An IPM approach should include:

- Conducting pest prevention activities. The activities may include biological, cultural, mechanical, and chemical control methods.
- Monitoring for the presence of pests, pest density, and pest damage.
- Setting action thresholds to determine whether pest control activities should occur. Base the decision on a cost/benefit analysis of the effects that pests have on the interests of producers, society, and the environment. Consider the potential effects to public health, public safety, the economy, and aesthetics.
- Evaluating the effectiveness of pest control activities.

According to the EPA, IPM plans meet technology-based effluent limits for the application of aquatic pesticides. For more information, see the EPA Pesticide General Permit (<https://www.epa.gov/npdes/pesticide-permitting-2016-pgp>). The EPA Pesticide General Permit requires that all applicants develop and implement Pesticide Discharge Management Plans that include IPM practices. The EPA also requires that state-issued NPDES permits related to the application of aquatic pesticides, be no less stringent than the federal permit.

Source Reduction

An important method to control mosquitoes is to reduce the amount of excess standing water. One way to do this is to control the amount of irrigation water used in agricultural areas. Another way is to remove stockpiles of items that can trap water, such as tires and containers.

Pesticide Application

Another method used by public agencies to control mosquito populations is applications of larvicides and adulticides. Larvicides target the pre-adult stages of the mosquito life cycle (egg, larva, and pupa). While adulticides target the flying adult mosquitoes. Because mosquito larva are concentrated and relatively immobile in waterbodies, they are easier to target and control than adult mosquitoes. MCDs focus about 80 to 90 percent of their effort on controlling mosquito larva.

Most MCDs only apply adulticides when adult populations become so large that they cause extreme annoyance to humans or when there is a great threat of disease transmission to humans or economically valuable livestock, such as cattle and horses.

Applicators distribute larvicides aerially or by hand. Hand applications include broadcast spreaders, such as backpack granulators, and liquid sprayers to spread pesticides. These tools can be carried by the applicator or mounted on ATVs (all-terrain vehicles). Aerial applications typically involve a conventional spray boom, which only uses a small volume of spray solution per acre.

The spray is made up of large drops that are distributed at a low pressure and low volume. The pilot monitors the flow rate to keep the pressure low. The pilot sprays the solution when air temperatures and wind speeds are low in order to minimize the drift of the solution. Larvicides are directly applied to waterbodies in order to target areas where mosquito larvae are maturing.

Applicators use ultra-low volume (ULV) application equipment to apply adulticides from air-based vehicles and ground-based vehicles. This equipment produces an invisible aerosol¹ that is designed to drift in order to maximize the amount of mosquitoes treated. This application method releases the pesticide in small droplets that volatilize quickly. Adulticide applications typically occur during dusk and dawn when mosquitoes are most active and females are searching for a blood-meal host.

2.3 Legal History of Aquatic Pesticides

Many events shaped how the application of aquatic pesticides is regulated in Washington State. A summary of these events is included below.

- 1972+ The Federal Clean Water Act delegated authority to the EPA to administer a permit program. The EPA delegated authority to Washington State to issue federal permits in certain situations.
- 1979+ The Federal Insecticide, Fungicide, and Rodenticide Act requires any person wishing to apply pesticides to Waters of the State to obtain an aquatic pesticide applicator license from the Washington State Department of Agriculture (WSDA) or operate under the supervision of an aquatic licensed pesticide applicator.
- 2001 The Ninth Circuit Court determined that pesticide applications must be covered by a NPDES permit.
- 2002 The Ninth Circuit Court determined that aerial spraying directly to, and over, surface waters is a point source of pollution and must be covered by a NPDES permit.
- 2005 The Ninth Circuit affirmed a district court's opinion that the pesticide applied was not a "pollutant" because it left no residue and did not cause an unintended effect. Therefore, a NPDES permit was not required.
- 2006 The EPA issued a federal rule addressing the application of pesticides. The rule stated that pesticides applied in accordance with the FIFRA label are not pollutants and, therefore, do not require coverage under a NPDES permit.
- 2007 The Washington State Pollution Control Hearings Board concluded that coverage under a NPDES permit is required for the application of pesticides, because they are considered a pollutant because they do not meet the criteria established by *Fairhurst v. Hagener* in 2005.
- 2009 The Sixth Circuit Court found that residues from applications of pesticides are considered "wastes" under the CWA and must be covered by a NPDES permit. The court also found the 2006 Federal Pesticide Rule to be invalid and gave the EPA 24 months to develop a NPDES permit to address discharges from aquatic pesticide applications.

The Federal Clean Water Act (CWA)

The Federal Clean Water Act (FCWA, 1972), and later modifications (1977, 1981, and 1987), established water quality goals for the navigable (surface) Waters of the United States. One of

¹ The average size of droplets in the aerosol are approximately thirty (30) microns.

the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA).

The EPA delegated the responsibility of administering the NPDES permit program in Washington State, to the State of Washington. Chapter 90.48 RCW defines Ecology's authority and obligations in administering the discharge permit program. Ecology does not have the authority to issue NPDES permits to federal facilities or to "Indian Country" as defined in 18 USC Sec. 1151.

Headwaters, Inc. v. Talent Irrigation District (March, 2001)

In May 1996, in southern Oregon, the Talent Irrigation District (TID) applied acrolein to a system of irrigation canals to control vegetation. The acrolein-treated water discharged into a fish-bearing creek and caused a fish kill. Later, Headwaters, Inc. and Oregon Natural Resources Council filed a Clean Water Act citizen suit against the TID for applying a pesticide into a system of irrigation canals without a NPDES permit.

In March 2001, the Ninth Circuit Court, in *Headwaters, Inc. v. Talent Irrigation District*, found that:

- Applying pesticides in compliance with the FIFRA labeling requirements did not exempt TID from having to obtain a NPDES permit.
- The applicator should have obtained coverage under a NPDES permit before applying aquatic pesticides to an irrigation canal. The decision addressed residues and other products of aquatic pesticides.
- The irrigation ditches were considered "waters of the United States" under the CWA (March 12, 2001).

The ruling by the Ninth Circuit Court reversed the opinion of a district court.

Based on the TID court decision, Ecology, with advice from the Washington State Office of the Attorney General, determined that all pesticide applications to surface Waters of the State must be covered by a NPDES permit. In 2002, Ecology issued the first NPDES general permit for pesticide applications to surface Waters of the State. Previously, Ecology regulated the application of aquatic pesticides to most surface waters by issuing administrative orders (called Short-Term Modifications of Water Quality Standards) to Washington-state licensed pesticide applicators. Since the Talent decision, there have been further court challenges about the applicability of NPDES permits to aquatic pesticide application as discussed below.

League of Wildlife Defenders et al v. Forsgren (November, 2002)

In the 1970's, the Douglas Fir Tussock Moth defoliated approximately 700,000 acres of Douglas Fir in Idaho, Oregon, and Washington. In response to this outbreak, the United State Forest Service (USFS) developed a system to predict tussock moth outbreaks and control them via aerial spraying of insecticides.

The League of Wildlife Defenders filed suit against the USFS for failing to obtain a NPDES permit under the CWA for the application of insecticides directly above surface waters. The USFS argued that any discharge of insecticides was nonpoint pollution, and that the discharges fell under federal exemptions (40 CFR 122.3) for silviculture activities.

In 2002, the Ninth Circuit Court reversed a district court's opinion upon appeal. It held that aerial spraying (from an aircraft fitted with tanks) directly to, and over, surface water is a point source of pollution, and requires a NPDES permit.

Fairhurst v. Hagener (September, 2005)

The Montana Department of Fish, Wildlife, and Parks (Montana) began a ten-year program to reintroduce threatened native westslope cutthroat trout into Cherry Creek. This project used antimycin to remove non-native rainbow and Yellowstone cutthroat trout from Cherry Creek over several years, after which it would reintroduce native trout.

Montana was sued under the citizen suit provision of the CWA for failing to obtain a NPDES permit before applying antimycin to surface waters. During summary judgment, the district court decided in favor of Montana. On appeal, the Ninth Circuit court affirmed the district court's opinion. The Ninth Circuit opined that:

A chemical pesticide applied intentionally, in accordance with a FIFRA label, and with no residue or unintended effect is not "waste, and thus not a "pollutant" for the purposes of the Clean Water Act. Because the Department's (Montana's) application of antimycin to Cherry Creek was intentional, FIFRA compliant, and without residue or unintended effect, the discharged chemical was not a "pollutant" and the Department (Montana) was not required to obtain a NPDES permit.

Neither the Court nor the EPA offered any guidance regarding which pesticide applications would result in no residue or unintended effect.

2006 Federal Pesticide Rule (November, 2006)

In November 2006, the EPA issued a final rule under the CWA entitled *Application of Pesticides to Waters of the United States in Accordance with FIFRA* (2006 Federal Pesticide Rule). This rule replaced a draft interpretive statement the EPA issued in 2003, concerning the use of pesticides in or around waters of the United States. The rule stated that any pesticide meant for use in or near water, applied in accordance with the FIFRA label, is not a pollutant under the CWA. Therefore, such applications are not subject to NPDES permitting.

In Washington State, Chapter 90.48 RCW requires that Ecology issue a short-term modification of the Washington State Water Quality Standards for the application of aquatic pesticides. Until the Headwaters Case in 2001, Ecology used an administrative order to issue site-specific short-term modifications. This approach to regulating applications of aquatic pesticides was challenged in the Ninth Circuit Court in 2001.

After the EPA issued the rule, Ecology consulted stakeholders to determine how Ecology should regulate the use of aquatic pesticides in Washington. Ecology met with stakeholders affiliated with each of the seven affected permits and provided a 3-week comment period. The consensus of these stakeholders was that Ecology should continue to issue permit coverages to regulate aquatic pesticide applications.

Because of stakeholder consensus and the need for a permit to implement short-term modifications, Ecology decided to continue to issue NPDES permit coverages to regulate the use of aquatic pesticides in and around Washington State Waters.

Northwest Aquatic Eco-Systems v. Ecology (June, 2007)

In February 2006, the Washington State Pollution Control Hearings Board (PCHB) issued a final order in Case #05-101, *Northwest Aquatic Ecosystems v. Ecology, Washington Toxics Coalition*. This case focused on a number of issues. One of the issues was determining if the application of federally-registered pesticides must be covered by a NPDES permit. In September 2005, in *Fairhurst v. Hagener*, the Ninth Circuit Court determined that the discharged chemical (aquatic pesticides) was not a “pollutant,” therefore a NPDES permit was not required.

The PCHB ruled on summary judgment that the *Fairhurst* decision does not provide a blanket exemption for the application of aquatic pesticides. They ruled that a pesticide must meet the following criteria in order for it to not be classified as a pollutant under the CWA (Fairhurst, 422 F.3d at 1150). The pesticide must:

- Be applied for a beneficial purpose.
- Be applied in compliance with FIFRA.
- Produce no pesticide residue.
- Produce no unintended effects.

Northwest Aquatic Ecosystems failed to demonstrate that the application of aquatic pesticides (diquat and endothall) met the criteria identified in *Fairhurst* (see the above bulleted list of criteria). Without this evidence, the PCHB concluded that a NPDES permit is required for the proposed pesticide applications.

National Cotton Council et al. v. EPA (January, 2009)

After the EPA issued the 2006 Federal Pesticide Rule, entities filed petitions in 11 of the 12 federal circuit courts requesting that the courts review the Federal Pesticide Rule. The federal courts combined the petitions into one case and assigned the case to the Sixth Circuit Court.

The Sixth Circuit Court made the following findings.

1. The court agreed with the Ninth Circuit Court’s decision in *Fairhurst v. Hagener*, that if a chemical pesticide is intentionally applied for a beneficial purpose and leaves no waste or residue after performing its intended purpose, then the discharge does not require a NPDES permit.
2. The court found that the excess pesticides and residues that enter water during and after

pesticide application:

- Are “wastes” under the CWA.
 - Must be covered by a NPDES permit before the pesticide application is made.
3. The court determined that the Federal Pesticide Rule is invalid because it conflicts with the requirements in the CWA. According to the CWA, discharges from pesticide applications require coverage under a NPDES permit. But according to the Federal Pesticide Rule, they are exempt from permit coverage.

The Sixth Circuit Court granted the EPA 24 months to develop a NPDES permit to address discharges from aquatic pesticide applications. On October 31, 2011, the EPA issued the federal general permit that covers the discharge of aquatic pesticides to manage aquatic plants and algae, aquatic animals, mosquitoes and flying insects, and pests in forest canopies.

The Federal Insecticide, Fungicide, and Rodenticide Act

The EPA regulates the pesticide application industry via the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The following excerpt from the EPA’s 2010 NPDES Pesticides General Permit Fact Sheet, explains FIFRA.

EPA regulates the sale, distribution, and use of pesticides in the U.S. under the statutory framework of the Federal Insecticide, Fungicide, and Rodenticide Act of 1979, to ensure that when used in conformance with the label, pesticides will not pose unreasonable risks to human health and the environment. All new pesticides must undergo a registration procedure under FIFRA during which EPA assesses a variety of potential human health and environmental effects associated with use of the product. Under FIFRA, EPA is required to consider the effects of pesticides on the environment by determining, among other things, whether a pesticide will perform its intended function without unreasonable adverse effects on the environment, and whether when used in accordance with widespread and commonly recognized practice [the pesticide] will not generally cause unreasonable adverse effects on the environment. 7 U.S.C. 136a(c)(5).

In performing this analysis, EPA examines the ingredients of a pesticide, the intended type of application site and directions for use, and supporting scientific studies for human health and environmental effects and exposures. The applicant for registration of the pesticide must provide specific data from tests done according to EPA guidelines.

When EPA approves a pesticide for a particular use, the Agency imposes restrictions through labeling requirements governing such use. The restrictions are intended to ensure that the pesticide serves an intended purpose and avoids unreasonable adverse effects. It is illegal under Section 12(a)(2)(G) of FIFRA to use a registered pesticide in a manner inconsistent with its labeling. States have primary authority under FIFRA to enforce “use” violations, but both the States and EPA have ample authority to prosecute pesticide misuse when it occurs.

After a pesticide has been registered, changes in science, public policy, and pesticide use practices will occur over time. FIFRA, as amended by the Food Quality Protection Act

of 1996, mandates a registration review program, under which [EPA] periodically reevaluates pesticides to make sure that as the ability to assess risk evolves and as policies and practices change, all registered pesticides continue to meet the statutory standard of no unreasonable adverse effects to human health or the environment. [EPA] is implementing the registration review program pursuant to Section 3(g) of FIFRA and will review each registered pesticide every 15 years to determine whether it continues to meet the FIFRA standard for registration. Information on this program is provided at http://www.epa.gov/oppsrrd1/registration_review/.

The EPA develops product-use requirements that are included on FIFRA labels. The EPA also requires that pesticide manufacturers:

- Register each pesticide.
- Provide evidence that the pesticide will function as promised.
- Minimize unacceptable environmental harm.

The Pesticide Management Division of the Washington State Department of Agriculture (WSDA) regulates pesticide use in Washington State. They:

- Register pesticides intended to be used in Washington.
- Issue licenses to pesticide applicators, dealers, and consultants.
- Investigate complaints such as label violations.
- Maintain a registry of pesticide sensitive individuals.
- Administer a program to collect and manage waste pesticides.

These duties are performed under the authority of the Washington Pesticide Control Act (Chapter 15.58 RCW), the Washington Pesticide Application Act (Chapter 17.21 RCW), the General Pesticide Rules (Chapter 16-228 WAC), the Worker Protection Standard (Chapter 16-233 WAC) and a number of pesticide and county-specific regulations. For more information, visit the following link. (<https://agr.wa.gov/Portals/PF/>)

FIFRA, as administered by the EPA and the Washington State Department of Agriculture (WSDA), requires that all persons that apply pesticides classified as restricted use be certified according to the provisions of the act, or that they work under the direct supervision of a certified applicator. In Washington, all pesticides labeled for aquatic use are classified as restricted use.

Commercial and public applicators must demonstrate a practical knowledge of the principles and practices of pest control and safe use of pesticides, which they accomplish by means of a “core” examination. In addition, applicators using or supervising the use of any restricted use pesticides purposefully applied to standing or running water (excluding applicators engaged in public health related activities) must pass an additional exam to demonstrate competency as described in the code of federal regulations as follows.

Aquatic applicators shall demonstrate practical knowledge of the secondary effects which can be caused by improper application rates, incorrect formulations, and faulty application of restricted pesticides used in this category. They shall demonstrate practical knowledge of various water use situations and the potential of downstream effects. Further, they must have practical knowledge concerning potential pesticide effects on plants, fish, birds, beneficial insects, and other organisms which may be present in aquatic environments. Applicants in this category must demonstrate practical knowledge of the principals of limited area application (40 CFR 171.4).

Any person wishing to apply pesticides to Waters of the State must obtain an aquatic pesticide applicator license from the WSDA or operate under the supervision of an aquatic licensed pesticide applicator. For more information on the Washington licensing testing and requirements, follow the following link. (www.agr.wa.gov/PestFert/LicensingEd/Licensing.htm)

2.4 Pesticide Registration and Licensing Information

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), also known as the Federal Insecticide Act of 1910, is a federal law established to control the use, distribution, and sale of pesticide products in the United States. The EPA administers and regulates the law and requires that all pesticides used in the United States are registered. Pesticide registration helps ensure that pesticides will be properly labeled, and that, when used according to the label, pesticides will not cause unreasonable harm to the environment.

To register a new pesticide, manufacturers of pesticides must submit technical information about the proposed pesticide uses, such as risk to humans and the environment, and the frequency of use. After the EPA reviews the information, a pesticide is registered for narrowly defined uses (e.g. specific crops). Because of the continually increasing knowledge of pesticides and their effects, EPA's goal is to review pesticide registrations every 15 years. More information about FIFRA pesticide registration may be found at the following link.

(<http://www.epa.gov/oecaagct/lfra.html#Registration%20of%20New%20Pesticides>)

FIFRA requires certification of all individuals that apply pesticides classified as restricted use. Commercial and public applicators must pass an examination to demonstrate practical knowledge of the principles and practices of pest control and safe use of pesticides. Applicators using or supervising the use of any restricted use pesticides applied to standing or running water (excluding applicators engaged in public health related activities) must pass an additional exam to demonstrate competency, as described in the code of federal regulations 40 CFR 171.4.

In addition to FIFRA requirements, the State of Washington requires pesticides be registered for use with the Washington State Department of Agriculture (WSDA). Pesticide applicators are also required to be licensed through the WSDA. Any person wishing to apply EPA-registered pesticides to Washington State waters must be licensed as an aquatic pesticide applicator or operate under the direct supervision of a State licensed applicator.

More information about Washington State testing and licensing requirements may be found at. (<https://www.agr.wa.gov/PestFert/LicensingEd/>)

Information about pesticide registration in Washington State may be found at the following website. (<https://www.agr.wa.gov/PestFert/Pesticides/ProductRegistration.aspx>)

3.0 OVERVIEW OF REGULATIONS

This section contains a brief description of Washington State statutes and rules that apply to the Mosquito General Permit. This review is **not** intended to be exhaustive. It provides a broad overview of the laws and rules under which Ecology has authority to regulate discharges to Waters of the State. The following laws and rules form the basis for the conditions in the Mosquito General Permit.

3.1 Applicable Laws and Rules

The Washington State Legislature gave Ecology the authority to control and prevent the pollution of Waters of the State, as stated in the Washington State Water Pollution Control Act, Chapter 90.48 RCW. This statute requires that an industrial or commercial facility obtain a permit before discharging wastes to Waters of the State. In order to control and prevent the pollution of state waters, Ecology adopted the following rules.

- Water Quality Standards for Groundwaters of the State of Washington.
(Chapter 173-200 WAC)
- Water Quality Standards for Surface Water of the State of Washington.
(Chapter 173-201A WAC)
- Sediment Management Standards
(Chapter 173-204 WAC)
- Determination and payment of permit fees.
(Chapter 173-224 WAC)
- Requirements for implementing and managing the State Waste Discharge Program.
(Chapter 173-226 WAC)
- Requirements for complying with the State Environmental Policy Act.
(Chapter 197-11 WAC)
- Requirements for complying with sections 120 and 130 of the State Fish and Wildlife Enforcement Code.
(Chapter 77-15 RCW, Sections 120 and 130)
- Requirements for complying with the federal Endangered Species Act
(16 USC 1531) (50 CFR 17.11(h))

Washington State Water Pollution Control Act

The Mosquito General Permit implements portions of the Washington State Water Pollution Control Act (Chapter 90.48 RCW). Chapter 90.48 RCW declares that maintaining the highest possible standards to insure the purity of all Waters of the State is the policy of the state. Healthy water quality must be maintained for public health, public enjoyment, protection of terrestrial and aquatic life, and the industrial development of the state. All known, available, and reasonable methods must be used by industries and others to prevent and control pollution (AKART).

In addition, it is unlawful for any person to discharge pollutants to Waters of the State unless a permit to discharge is obtained from Ecology prior to the discharge occurring. (RCW 90.48.080 and 90.48.160)

Water Quality Standards for Groundwaters of the State of Washington

Chapter 173-200 WAC – Water Quality Standards for Groundwaters of the State of Washington, establishes groundwater quality standards which protect the environment, human health, and existing and future beneficial uses of groundwater. The goal is to maintain the highest quality of the state’s groundwater and to protect the many uses of groundwater through the reduction or elimination of contaminants discharged to the state’s groundwaters.

Ecology assessed the pesticides authorized for use under the Mosquito General Permit, to determine the pesticide’s potential impact to groundwater quality. Ecology does not expect any pesticides authorized for use under the permit to contaminate groundwater.

Water Quality Standards for Surface Waters of the State of Washington

Chapter 173-201A WAC – Water Quality Standards for Surface Waters of the State of Washington, establishes water quality standards for surface waters of the State of Washington. These standards are consistent with:

- Public health
- Public enjoyment of the waters
- Propagation and protection of fish, shellfish, and wildlife.

The goal is to maintain the highest quality of the state’s surface water and to protect the many uses through the reduction or elimination of contaminants discharged to the surface Waters of the State.

Sediment Management Standards for Washington State

Chapter 173-204 WAC –Sediment Management Standards establishes standards for the quality of surface sediments. It also prescribes how the standards should be applied and outlines a process for the cleanup of contaminated sediments. The purpose of this rule is to reduce and eliminate adverse effects on biological resources and significant health threats to humans from sediment contamination.

To demonstrate compliance with this rule, Ecology may require a discharger to assess the discharge and determine the potential for the discharge to create a sediment impact (WAC 173-204-400). For more information about sediment quality, visit the Aquatic Lands Cleanup Unit webpage at the following link. (<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Sediment-technical-resources-for-sediment-cleanup>)

After reviewing the activity and discharge characteristics, Ecology determined that the discharge conditionally authorized by the permit has no reasonable potential to violate the Sediment Management Standards.

Waste Discharge General Permit Program

Chapter 173-226 WAC – Waste Discharge General Permit Program establishes a state general permit program for the discharge of pollutants to Waters of the State under the authority granted to Ecology in Chapter 90.48 RCW. Permits issued in accordance with Chapter 173-226 WAC may be State Waste Discharge General Permits or combined National Pollutant Discharge Elimination System and State Waste Discharge General Permits.

State Environmental Policy Act

Chapter 197-11 WAC – State Environmental Protection Act (SEPA), identifies and analyzes environmental impacts associated with governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies, and plans.

For the reissuance of the draft permit, Ecology evaluated potential environmental impacts from mosquito control activities and documented them in the SEPA Checklist. The SEPA Checklist and Determination of Nonsignificance are available on Ecology's website at the following link. (<https://ecology.wa.gov/mosquitopermit>) Ecology included conditions in the draft permit to mitigate environmental impacts of concern noted in the evaluations.

Endangered and Sensitive Species

The EPA has implemented an Endangered Species Protection Program (ESPP) to identify all pesticides that may cause adverse impacts on threatened, endangered, sensitive, and candidate species (vulnerable species) and measures that will mitigate these impacts. When the ESPP identifies an adverse impact, it requires use restrictions to protect the sensitive species at the county level. The EPA specifies these use restrictions on the FIFRA label or distributes the information on a county-specific Endangered Species Protection Bulletin. These bulletins are enforceable under FIFRA. Special Condition S3.A.2, Special Condition S4, and General Condition G2 of the draft permit requires the Permittee to comply with all applicable federal regulations, including FIFRA and the Endangered Species Act.

Ecology added additional restrictions in the draft permit to protect sensitive species. The draft permit limits the application of pesticides for mosquito control in areas identified by the Washington State Department of Fish and Wildlife (WDFW) as being critical habitat for vulnerable species. For more information, see Special Condition S4.B.4 in the draft permit.

3.2 Effluent Limits

Federal and State regulations require that effluent limits in NPDES permits are either technology-based limits or water quality-based limits.

- Technology-based limits are based on the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation (40 CFR 125.3). They are also developed by Ecology on a case-by-case basis (Chapter 173-226 WAC).
- Water quality-based limits are calculated so that the effluent complies with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter

173-200 WAC), Sediment Management Standards (Chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).

Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

Technology-Based Limits

Sections 301, 302, 306, and 307 of the CWA establish discharge standards, prohibitions, and limits based on pollution control technologies. Technology-based limits are categorized in the following ways.

- Best practical control technology (BPT).
- Best available technology economically achievable (BAT).
- Best conventional pollutant control technology economically achievable (BCT).

Washington has similar technology-based limits described as "all known, available and reasonable methods of control, prevention, and treatment (AKART)" methods. State law refers to AKART under RCW 90.48.010, RCW 90.48.520, 90.52.040, and RCW 90.54.020. The Federal technology-based limits and AKART are similar, but not equivalent. Ecology may establish AKART:

- For an industrial category or for an individual permit on a case-by-case basis.
- That is more stringent than Federal regulations.
- That includes BMPs such as prevention and control methods (i.e. waste minimization, waste/source reduction, or reduction in total contaminant releases to the environment).

Permit writers also use their best professional judgment (BPJ) to establish permit requirements. Ecology and the EPA concur that AKART may be equivalent to best professional judgment (BPJ) determinations.

Water Quality-Based Limits

The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) were designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet established surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin-wide total maximum daily loading study (TMDL).

Ecology conditions NPDES and waste discharge permits so that authorized discharges meet water quality standards. The characteristic beneficial uses of surface waters include:

- Domestic water supply.
- Industrial and agricultural water supply.
- Stock watering.
- The spawning, rearing, migration, and harvesting of fish.

- The spawning, rearing, and harvesting of shellfish.
- Wildlife habitat.
- Recreation (primary contact, sport fishing, boating, and aesthetic enjoyment of nature).
- Commerce.
- Aesthetics.
- Navigation.

In addition to considering the designated use of the receiving water, Ecology also uses numeric and narrative criteria when establishing effluent limits as required by Chapter 173-201A WAC.

Numeric criteria

Numeric water quality criteria are published in the Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving waters to protect aquatic life and recreation in and on the water. To derive effluent limits, Ecology uses numeric criteria in addition to the chemical and physical data for the wastewater and receiving water. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

The EPA published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (40 CFR 131.36). The EPA designed these criteria to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. After considering existing data, Ecology determined that the discharges conditionally authorized by this permit do not contain chemicals of concern. Chemicals of concern may be part of the “other ingredients” listed on FIFRA labels. However, Ecology does not have access to the “other ingredients” because they are proprietary.

Narrative criteria

Narrative criteria (e.g. WAC 173-201A-240(1); 2006) are statements that describe the desired water quality goal, such as waters being “free from” pollutants such as oil and scum, color and odor, and other substances that can harm people and fish. Narrative criteria limit the toxic, radioactive, or other harmful material concentrations that may be discharged. The goal is to reduce the concentration to levels that do not have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Ecology uses these criteria to establish limits for pollutants that are difficult to use a numeric value to quantify. For example, pollutants that offend the senses (e.g., color and odor). Narrative criteria protect the specific designated uses of all freshwaters (WAC 173-201-A-200) and of all marine waters (WAC 173-201A-210) in the State of Washington.

Short-Term Water Quality Modification Provisions

Chapter 173-201A WAC allows water quality criteria to be modified on a short-term basis when necessary to protect the public interest, even though such activities may result in a temporary reduction of water quality conditions. A short-term exceedance only applies to short-lived impairment (hours or days). But short-term exceedances may occur periodically throughout the 5-year permit term. Short-term exceedances may also extend over the 5-year life span of the permit (long-term exceedance), provided the Permittee satisfies the requirements of WAC 173-201A-410.

The draft permit includes a short-term water quality modification provision. This provision allows authorized discharges to cause a temporary diminishment of some designated beneficial uses while mosquito-control activities occur in and around various waterbodies across Washington. Activities covered under the draft permit are allocated a temporary zone of impact on beneficial uses, as long as:

- The impact is short-lived (hours or days).
- Once the activity concludes, water quality is fully restored and the beneficial uses are protected.

The conditions of this permit constitute the requirements of a short-term water quality modification.

Evaluation of Water Quality-Based Effluent Limits for Numeric Criteria

In 2016, in response to permit violations, a Permittee conducted a deposition study to determine the amount of pesticide deposited after an aerial application. The study focused on a variety of habitat types frequented by northern leopard frogs in Grant County. Five locations were chosen and included an aquatic zone, a riparian zone, and a terrestrial zone. Six deposition cards were placed at each of the five locations.

The pesticide Duet was applied via ultra-low volume aerial spray methods. Duet is a pesticide that contains the active ingredients sumithrin, prallethrin, and the synergist piperonyl butoxide (PBO). After the application, the deposition cards were collected and sent to a laboratory for analysis and to quantify the amount of sumithrin, prallethrin, and PBO deposited. At the time of this reissuance, a report based on the deposition study data has not been completed.

Ecology determined that the application of conditionally authorized:

- Larvicides will not violate water quality standards or degrade existing uses, as long as applicators comply with conditions in the permit and requirements on the FIFRA label.
- Adulticides will not violate water quality standards or degrade existing uses, as long as applicators comply with conditions in the permit, apply adulticides in accordance with their IPM plan, and follow the instructions on the FIFRA label.

3.3 Antidegradation

Chapter 173-201A WAC requires that all surface Waters of the State are protected by numeric and narrative criteria, designated uses, and an antidegradation policy. The purpose of Washington's Antidegradation Policy (WAC 173-201A-300 to 330) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Ensure that all human activities likely to contribute to a lowering of water quality at a minimum apply AKART.

Washington's Antidegradation Policy applies to human activities that are likely to impact the quality of surface Waters of the State. To comply with the policy, the project must apply the three tiers of protection, described below, to surface Waters of the State.

- Tier I ensures that existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions
- Tier II ensures that dischargers do not degrade waters of a higher quality than the criteria assigned unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.
- Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

All Permittees covered under the general permit must comply with the provisions of Tier I (WAC 173-201A-320(6)). Ecology determined that the draft permit does not cover discharges to Tier III waters. To conduct an antidegradation Tier II analysis, Ecology must:

- Use the information collected during the implementation of the permit, to revise the permit or program requirements.
- Review and refine management and control programs in cycles not to exceed five years or the period of permit reissuance.
- Include a plan that describes how Ecology will obtain and use information to ensure full compliance with water quality standards. Ecology must develop and document the plan in advance of permit or program approval.

The reissuance of the draft permit is the public's opportunity to consider the requirements in the permit and provide comment about whether the permit serves the public's interest. So that the public has the opportunity to provide comment on individual permit coverages, each entity that applies for coverage under the Mosquito General Permit must publish requests for coverage in a local paper. The public notice of request for permit coverage must include the following information.

- A statement that the applicant is seeking coverage under the Mosquito General Permit.
- The name, address, and phone number of the applicant.
- The identity of the waterbody proposed for treatment.
- A list of products planned for use.

- The statement: “Any person desiring to present their views to the Department of Ecology regarding this application shall do so in writing within 30 days of the last date of publication of this notice. Comments must be submitted to the Department of Ecology. Any person interested in the Department’s action on the application may notify the Department of interest within 30 days of the last date of publication of this notice.”

This fact sheet represents Ecology’s antidegradation analysis and antidegradation plan for the Mosquito General Permit.

4.0 AUTHORIZED ACTIVE INGREDIENTS

Due to the nature of treatments to control mosquitoes, it is unlikely that chronic exposure to mosquito control pesticides will occur. However, examples of potential effects of chronic exposure are provided for each pesticide discussed below, for both larvicides and adulticides.

A general overview of the pesticides proposed for inclusion in the Mosquito General Permit, both larvicides and adulticides, is included below as well as the potential impacts to animals and aquatic life.

4.1 Larvicides

The permit authorizes the discharge of several larvicidal active ingredients for Permittees to control mosquitoes. The active ingredients included for use in the draft general permit include the following. Information about these larvicides is included below

- *Bacillus sphaericus* (H-5a5b)
- *Bacillus thuringiensis israelensis* (BTI)
- Larvicidal oils
- Malathion
- Methoprene
- Monomolecular surface films
- Spinosad
- Temephos

Bacillus Sphaericus (B.sphaericus)

Bacillus sphaericus is a naturally occurring (where it does occur), spore-forming bacterium, which produces a protein endotoxin at the time of sporulation. The toxin is only active against the larval stage and must be ingested and digested before it activates. *B. sphaericus* is uniquely able to control mosquito larvae in highly organic aquatic environments such as manure waste lagoons and stormwater catch basins.

B. sphaericus can offer up to six weeks of control in many habitats because the protoxins and spores can remain suspended in the water column for extended periods of time and because of the recycling of bacteria in dead larvae. The duration of control will depend on habitat factors such as water depth, flushing, water chemistry and the frequency of oviposition to maintain the recycling process. Vectolex, the trade name for *B. sphaericus*, is available in corncob granule, water dispersible granule, and water dispersible pouch formulations.

B. sphaericus was first registered for the control of *Culex* mosquitoes but its uses have been expanded to include control of several *Aedes*, *Anopheles*, *Ochlerotatus*, *Psorophora* and *Coquilettidia* species. *B. sphaericus* is not acutely toxic to freshwater and saltwater invertebrates, honeybees, and mayfly larvae. *B. sphaericus* does not appear to be harmful to fish and other marine life and it is not toxic to birds on a sub-chronic basis. In tests, *B. sphaericus* was not pathogenic, infective, or toxic in laboratory animals by the oral, dermal, pulmonary, and

intravenous routes of exposure. In humans, mild skin and eye irritation can occur with direct contact.

Bacillus Thuringiensis Israelensis (BTI)

Bacillus thuringiensis, subspecies *israelensis* (BTI) is a naturally occurring soil bacterium that can effectively kill mosquitoes during the larval stage of development. BTI is an endospore-forming bacterium that is ingested by the actively feeding larvae. When the bacteria BTI encysts, it produces a protein crystal toxic to mosquito larvae. Once the bacteria have been ingested, the toxin disrupts the lining of the larvae's intestine causing it to stop eating and die.

BTI is the primary material used for mosquito control because of its low toxicity to non-target species. BTI is highly effective against the first through third larval instars of mosquitoes (family *Culicidae*), blackflies (Family *Simuliidae*) and has some virulence against certain other *Dipteran* Families, especially midges (Family *Chironomidae*). BTI has been extensively studied for effects on non-target organisms and environmental consequences of use with no reported adverse effects. It is not toxic to bees. According to several studies, when applied at field application rates, BTI has no reported effect on fish and amphibians. Studies have also found no effect on warm-blooded mammals. Labels indicate that direct contact with the products may cause mild eye or skin irritation.

BTI products are available in liquid, pellet, granular, and briquette formulations. The type of BTI formulation influences the activity of the product. Generally, BTI does not persist long after application, with toxicity persisting from 24 hours to over one month when the longer lasting formulations are used.

Larval toxicity can depend on the species, its feeding activity and other possible factors such as UV light, water quality, pH, temperature, agitation, and sedimentation. Commercially-available BTI strains are sold under several names, including Aquabac, Bactimos, Bonide Mosquito Beater "Plunks", Healthy Ponds, Sentry, Summit BTI Briquettes, Teknar and Vectobac. A number of BTI products are available for residential use in waterbodies, such as lined ornamental ponds, and are sold under various trade names such as Bayer Advanced Garden Mosquito Preventer, Beckett Skeeter Stopper, Mosquito Depth Charges, Mosquito Dunks, Mosquito Bits Quick-Kill, and Spectracide Mosquito Stop.

Larvicidal Oils

Larvicidal oils, like paraffinic white mineral oil, are used to form a coating on top of water to drown larvae, pupae, and emerging adult mosquitoes. Oils are petroleum or mineral based and are typically used as a product of last resort for the control of mosquito pupae, since this stage does not feed, but does require oxygen.

Oils can persist for 12 to 15 hours and then evaporate within a few days. Larvicidal oils, if misapplied, can be toxic to fish and other aquatic organisms. Studies have shown that aquatic invertebrates, amphibians, waterfowl, furbearers, and fish may be negatively affected. The Draft Aquatic Mosquito Control NPDES General Permit requires consultation and agreement of the WDFW prior to using these products in areas where vulnerable species are present.

Malathion

Malathion is a broad spectrum organophosphate insecticide. It is used in agriculture, residential, pharmaceutical, and public health programs across the country to control a large number of pests.

Relatively resistant to UL degradation (photolysis), malathion is susceptible to hydrolysis in alkaline conditions. In neutral to alkaline conditions, the half-life of malathion is 1 to 2 weeks and in acidic conditions, the half-life is 107 days. Information included in the EPA revised Reregistration Eligibility Decision (RED) for Malathion indicates that malaoxon (malathion primary metabolite) can remain stable for at least 72 hours, which is long enough to reach domestic drinking water supplies in some areas.

The half-life in soil is 1 to 25 days, depending on microbial activity, with higher activity resulting in a shorter half-life. Malathion does not adsorb to soils very well so it is somewhat mobile in the soil, and has the potential to leach to groundwater.

Like other organophosphates, it works by disrupting the central nervous system through cholinesterase inhibition. Its primary metabolite—malaoxon—is also a cholinesterase inhibitor. Carboxyesterase activity in the body works to reduce the effects of malathion and malaoxon accumulation. Carboxyesterase are more active in mammals than insects, which can explain the higher toxicity in insects.

Malathion has a low toxicity to mammals. However, during inhalation tests, some respiratory lesions and a decrease in cholinesterase activity are present at high doses of malathion. Life threatening exposure can cause respiratory distress, diarrhea, tremors, confusion, seizures, and coma.

Malathion is highly toxic to beneficial insects and aquatic organisms (both vertebrates and invertebrates) during acute and chronic testing. Acute toxicity is not expected in reptiles as they have detoxification efficiency similar to mammals.

The National Marine Fisheries Service (NMFS) completed a biological opinion on the effects of the EPA's malathion re-registration decision to endangered Pacific Salmon in 2008. The NMFS concluded that the EPA re-registration of malathion would jeopardize the existence of 27 endangered populations and adversely modify critical habitat for 25 endangered pacific salmonids. The EPA is required to develop endangered species bulletins at the county level, or include FIFRA label requirements for California, Idaho, Oregon, and Washington. The county-level bulletins must address the following information.

- Where ground applications are permitted.
- Where aerial applications are permitted.
- Winds speeds during application are to be less than 10 mph.
- Agricultural uses will have a minimum of 20 feet of non-crop vegetation on the downhill side of the application areas immediately adjacent to any surface water that have a connection to salmonid bearing waters.
- Do not apply products when soil moisture is at field capacity or when a weather event is likely to produce run-off from the application site within 48 hours of application.

- Report all incidents of fish mortality that occur within 4 days of application and within the vicinity of the application area. More information about the NMFS biological opinion may be found at the following links, and a search for “pesticide” may be done at the last link.

(<https://www.fisheries.noaa.gov/national/endangered-species-conservation/biological-opinions#biological-opinions-available-online>)

(<https://repository.library.noaa.gov/view/noaa/14798>)

(<https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts>)

However, the use of malathion for public health purposes is exempt from the label or bulletin requirements related to the biological opinion.

Malathion use as a larvicide is restricted under Ecology’s Draft Aquatic Mosquito Control NPDES General Permit. Malathion may only be used for the control of mosquito larvae with Ecology approval after consultation between Ecology, the DOH, and the WDFW in response to a public health emergency or pesticide resistance in a mosquito population. This limits the amount and number of times that malathion may be discharged to surface waters.

Methoprene

Methoprene is a compound that mimics the action of an insect growth-regulating hormone and prevents the normal maturation of insect larvae. Unable to metamorphose, the mosquitoes die in the pupal stage. Methoprene is classified as a biochemical pesticide because it controls mosquito larvae by interfering with the insect’s life cycle rather than through direct toxicity.

Methoprene is available in numerous formulations and sold under the product names: Zoecon Altosid, Biosid, and Strike. Formulations labeled for residential use are sold under the names Pre-Strike and Vet-Kem.

Studies indicate that methoprene has a low toxicity and poses little risk to people when used according to label instructions. Methoprene was not shown to have any significant toxicological effects in the standard battery of toxicity studies used to assess human health effects. The pesticide has very low acute oral and inhalation toxicity potential and is not an eye or skin irritant. Methoprene also has a low acute dermal (skin) toxicity and is not a human skin sensitizer.

In laboratory tests, the toxicity of methoprene to birds and fish is low, and it is nontoxic to bees. Field studies involving methoprene have shown that it has no lasting adverse effects on populations of invertebrates or other non-target aquatic organisms when used according to label instructions for mosquito control.

Methoprene mosquito control products present minimal acute and chronic risk to freshwater fish, freshwater invertebrates, and estuarine species. Methoprene is not persistent in the environment. It degrades rapidly in water, being susceptible to transformation by sunlight and microorganisms.

Monomolecular Surface Films

Monomolecular surface film (MMSF) is a non-petroleum surface oil that acts as a physicochemical agent by altering the mosquito's habitat. It belongs to the alcohol ethoxylate group of surfactants—products meant to increase product efficacy—which are used in detergent products. MMSFs disrupt the cohesive properties of water, which allow mosquitoes to use the water's surface as an interface for breeding. In effect, by making the surface "wetter," MMSFs drown mosquitoes.

MMSFs kill larvae and pupae by making it impossible for them to keep their breathing tubes above the water's surface. Mosquitoes that require little or no surface contact for breathing, such as *Coquillettidia* species, require properly timed applications at surface contacting stages—the pupae to emerging adult—for maximum impact. Since MMSFs kill mosquitoes with a physical mechanism (rather than a toxic mechanism), it is not effective in habitats with persistent winds of greater than ten miles per hour, or in areas with very choppy water.

Some species, such as the midge, and some arthropods that require attachment to the water surface, have been shown to be affected. MMSF is non-toxic to most non-target wildlife. After being exposed to a constant film presence for six months, the green tree frog progressed normally from tadpole to adult through several generations. According to the EPA, MMSFs pose minimal risks to the environment when used according to directions on the FIFRA label.

MMSFs are not a skin irritant. They are only a mild eye irritant with prolonged or repeated contact and they are considered to be non-toxic according to animal tests. As with all pesticides, direct contact should be avoided. The film persistence is dependent on temperature, water flow, the amount of bacteria in the water, and the duration and strength of the wind following application. MMSFs typically persist on the water's surface for 5 to 22 days.

Spinosad

Spinosad consists of two chemicals—spinosyn A and spinosyn D—and is derived from a naturally occurring soil-borne bacterium. Spinosad has been registered for use as a pesticide by the EPA since 1997.

Spinosad has a low toxicity to humans and other mammals and is not likely to cause cancer. Spinosad was also not shown to be mutagenic. The EPA classifies spinosad as a reduced risk pesticide.

Spinosad has a half-life in water of less than one day and breaks down rapidly in the presence of sunlight. It binds rapidly to sediment and has a low potential to move through the soil and into groundwater. Spinosad is:

- Practically non-toxic to moderately toxic to fish.
- Slightly toxic to moderately toxic to aquatic invertebrates.
- Practically non-toxic to slightly toxic to birds tested.

Spinosad is highly toxic to bees, but once the spinosad product has dried, there is little to no effect on bees. However, the Aquatic Mosquito Control NPDES General Permit regulates applications of spinosad to water to control larvae, therefore, it is unlikely that bees will be impacted by its use.

Spinosad is not toxic to plants when used as directed by the FIFRA label.

Temephos

Temephos is a broad spectrum, non-systemic organophosphate insecticide. It is registered for use only as a mosquito larvicide. It is a hydrophobic pesticide but does bioaccumulate. Nearly 75% of temephos that is bioaccumulated is eliminated over time with no exposure.

Temephos is not very persistent in water, but binds tightly to soils and sediments. However, temephos' degradants do not bind tightly to soils, which could lead to continued suspension or re-suspension in water. The half-life of temephos in soil is estimated to be 30 days.

Like other organophosphates, temephos works by disrupting the central nervous system through cholinesterase inhibition. It has a lower toxicity to mammals, but in chronic exposure studies, cholinesterase inhibition and reduced liver weights were noted. Testing with rats found that while some temephos remained in the body, most of it was eliminated unchanged through feces and urine.

Depending on the product formulation, temephos is moderately to very highly toxic to beneficial insects and aquatic organisms (both vertebrates and invertebrates) during acute and chronic testing. It is also moderately to highly toxic to some species of birds.

Temephos use as a larvicide is restricted under the Draft Aquatic Mosquito Control NPDES General Permit, and is not permitted for use as an adulticide. Temephos may only be used to control mosquito larvae in:

- Non-potable, highly polluted water.
- Water with a high organic content (such as sewage lagoons, manure lagoons, or pastures, all of which must have no surface water run-off).
- Response to pesticide resistance development within a specific population of mosquitoes.

Ecology must approve the use of temephos after consultation between Ecology and the WDFW, in response to a public health emergency or pesticide resistance. This limits the amount and number of times that temephos may be discharged to surface waters.

At the time of this writing, there is no active registration for temephos with the EPA or the WSDA. It is the Permittee's responsibility to check the registration of a pesticide before they apply the pesticide.

4.2 Adulticides

The Mosquito General Permit authorizes the incidental discharge of several adulticidal active ingredients when an entity is working to control mosquitoes. The active ingredients included for use in the draft general permit include the following. Information about these adulticides is included below.

- Naled

- Piperonyl butoxide (PBO)
- Pyrethrins and pyrethroids
 - Deltamethrin (see “pyrethrins and pyrethroids” below)
 - Etofenprox (see “pyrethrins and pyrethroids” below)
 - Natural pyrethrins (see “pyrethrins and pyrethroids” below)
 - Permethrin (see “pyrethrins and pyrethroids” below)
 - Prallethrin (see “pyrethrins and pyrethroids” below)
 - Resmethrin (see “pyrethrins and pyrethroids” below)
 - Sumithrin (d-phenothrin) (see “pyrethrins and pyrethroids” below)

Naled

Naled is a broad spectrum, non-systemic organophosphate insecticide. It is registered for use as a mosquito adulticide. Naled has one metabolite—dichlorvos (DDVP)—that is also an organophosphate pesticide registered with the EPA.

Like other organophosphates, Naled works by disrupting the central nervous system through cholinesterase inhibition. Naled is:

- Moderately to highly toxic to birds.
- Highly toxic to non-target insects (such as honeybees).
- Moderately to very highly toxic to aquatic organisms.
- Moderately toxic to mammals on an acute basis, with some chronic effects.

Naled, use as an adulticide, is restricted under the Draft Aquatic Mosquito Control NPDES General Permit. It is not permitted for use as a larvicide. Naled may only be used for control of adult mosquitoes in accordance with the Permittee’s Integrated Pest Management (IPM) plan. Additionally, because Naled is an organophosphate and is toxic to non-target species, Permittees may not apply naled in areas of concern (see Section 5.4).

Piperonyl Butoxide

Piperonyl butoxide is a pesticide that is added to many pesticide formulations. It increases the effect of pyrethrins and pyrethroids by acting as a synergist. PBO increases the insecticidal properties by reducing the effectiveness of the detoxification enzyme that works to eliminate pyrethroids from an insect’s system. This reduces the dose of pyrethroids necessary to cause mortality in mosquitoes, other insects, and some small mammals (rats, mice).

PBO is only slightly toxic to humans and other larger mammals. However, some transient enzyme inhibition has been observed. The target organ in mammals is the liver, and chronic exposure can lead to increases in liver weight. PBO also has a low to very low toxicity to birds.

As a single pesticide test, PBO is moderately toxic to aquatic organisms. Acute testing of freshwater fish and invertebrates resulted in a LC50’s of 1.9 and 0.51ppm, respectively. No-observed-adverse-effect levels have also been estimated for PBO at 0.04ppm for freshwater fish and 0.03 for freshwater invertebrates.

PBO is always in as a synergist for a primary active ingredient, and is not used as a single active ingredient as an adulticide or insecticide.

Pyrethrins and Pyrethroids

The Draft Aquatic Mosquito Control NPDES General Permit includes the following pyrethrins and pyrethroids to control mosquitoes. This section provides a general overview of the pyrethrin and pyrethroid group, as well as a brief description about each of the specific adulticides in the group.

- Deltamethrin
- Etofenprox
- Natural pyrethrins
- Permethrin
- Prallethrin
- Resmethrin
- Sumithrin (d-phenothrin)

Natural Pyrethrins are compounds isolated from the chrysanthemum flower (*Chrysanthemum cinerariaefolium*) with insecticidal properties. A number of synthetic derivatives have been created from pyrethrins and are referred to as “pyrethroids.” Pyrethroids are more UV stable—resist UV degradation—and cost effective to produce.

As a group, pyrethrins and pyrethroids mostly have a similar mode of action. These pesticides interfere with the sodium channels in nerve cells that serve as part of the nervous system communication system. However, it is unknown if all pyrethroids alter the same sodium channels.

Pyrethroids have a very low toxicity to humans and other larger mammals. The EPA lists pyrethroid compounds as class 3 or 4, depending on the exposure route for acute testing. Class 3 pesticides are rated slightly toxic by the EPA, while class 4 pesticides are practically non-toxic.

Pyrethroids are toxic to beneficial insects such as butterflies, moths, and bees. Insects of similar size, such as midges, may see an increase in mortality after pesticide application. Larger insects may also be affected. LD50 mortality is seen in *Apis Mellifera*—the domestic honeybee—at an average of 0.08 micrograms (µg) per bee. The EPA lists toxicity to bees from permethrin for dermal exposure at LD50 = 0.13 µg per bee and oral exposure at LD50 = 0.024 µg per bee.

The EPA lists pyrethroids as highly toxic to very highly toxic to aquatic organisms. Results from acute testing of active ingredients on freshwater fish range from LC50 of 0.28 to 5.1 ppb. Chronic toxicity with freshwater invertebrates lists results for No Observed Adverse Effect Concentration (NOAEC) at 0.039 to 0.86 ppb.

Pyrethroids have a high affinity to binding to soils, waterbody sediments, and suspended sediments. This high affinity to binding should greatly reduce the likelihood that pyrethroids will leach into groundwater.

A general description of the pyrethrins and pyrethroids is included below.

- Deltamethrin

In its purest form, deltamethrin is made up of colorless or white to light beige crystals that have no odor. It is effective against mosquitoes via ingestion and direct contact, and is non-selective. Deltamethrin disrupts the mosquitoes' normal nervous system function.

Deltamethrin is less toxic to mammals due to mammals' higher body temperature, larger body size, and decreased sensitivity of the ion channel sites. However, it can be harmful if it is swallowed. After ingesting deltamethrin, humans may experience abdominal pain, convulsions, muscle twitching in hands and feet, headache, and delirium. Deltamethrin also causes moderate eye irritation and can cause reactions in some individuals when there is prolonged or frequent skin contact. The EPA classifies deltamethrin as not likely to be a human carcinogen.

The effects deltamethrin has on mammals varies depending on the mammal, the route of exposure, and the amount of deltamethrin the mammal was exposed to. For instance, when rabbits were exposed to deltamethrin, they experienced slight to moderate skin irritation. After ingesting 100 mg/kg of deltamethrin, some dogs exhibited vomiting, hyperexcitability, stiffness in the hind legs, and impaired body movement. However, laboratory animals that ingested deltamethrin while pregnant did not have offspring with birth defects.

Deltamethrin is moderately to highly toxic to fish under laboratory conditions. However, it is not expected to affect fish when used according to the FIFRA label because it binds tightly to soil and breaks down quickly.

Deltamethrin is extremely toxic to aquatic invertebrates. And, under laboratory conditions, it is highly toxic to bees. In field studies, deltamethrin did not harm bees at rates up to 12.5 g a.i./ha. Formulated products had a repellent effect that lasted up to 3 hrs. Deltamethrin had no effects on earthworms when the soil was treated with 12.5 g/ha, and it was practically non-toxic to birds when they ate it.

- Etofenprox

Etofenprox is a synthetic pyrethroid and its mode of action is similar to other pyrethroids. However, etofenprox differs in structure from other pyrethroids because it is an ether compound and pyrethroids are esters. According to the EPA, no available data suggests that etofenprox targets the sodium channel and that exposure to etofenprox does not result in the neurotoxic syndromes typical of pyrethroids.

Etofenprox is toxic to mosquitoes and is non-selective. Etofenprox is toxic to mammals if high doses are ingested. When ingested by mammals, etofenprox targets the liver, thyroid, kidney, and hematopoietic system. It has a low acute toxicity via the oral, dermal, and inhalation routes. It is not an acute eye or skin irritant, however it can cause skin irritation after repeated exposure. The EPA classifies etofenprox as not likely to be a human carcinogen.

Etofenprox is toxic to fish and aquatic invertebrates. It is highly toxic to bees and has a low toxicity to birds. It degrades rapidly when exposed to UV and is decomposed in the soil by anaerobic and aerobic microorganisms.

- Natural pyrethrins

See the general description for “natural pyrethrins”, included above.

- Permethrin

Permethrin affects mosquitoes via ingestion and direct contact, and is non-selective. It affects their nervous system, causing muscle spasms, paralysis, and death. Permethrin is more toxic to insects than to mammals, such as humans and dogs, because insects can't break down permethrin as quickly as mammals.

Humans exposed to permethrin via direct contact on their skin may experience irritation, tingling, and possibly burning at the contact site. It can also cause redness, pain, and burning if it enters the eyes. If ingested or inhaled, permethrin can cause irritation to the respiratory system, abdominal pain, nausea, vomiting, headaches, and dizziness.

Permethrin is highly toxic to fish and aquatic invertebrates, both in fresh water and salt water environments. It is highly toxic to honeybees and other beneficial insects, but has a low toxicity to birds.

- Prallethrin

Prallethrin is a synthetic pyrethroid and its mode of action is characteristic of other pyrethroids. Prallethrin is toxic to mosquitoes and is non-selective. It stimulates the nervous system and blocks nerve impulse transmissions. This eventually causes paralysis and death.

Prallethrin has a low toxicity to mammals with no evidence of carcinogenicity. It can be moderately toxic when ingested or inhaled. Chronic studies conducted on rats ingesting prallethrin for 21 days resulted in tremors, sensitivity to external stimuli, twitching, and writhing spasms. Prolonged exposure to prallethrin revealed slight toxic effects mainly in the liver, kidney, and thyroid. It has a low toxicity via the dermal route, is a non-irritant to skin, and a minimal irritant to the eyes. The EPA classifies prallethrin as not likely to be a human carcinogen.

Prallethrin is very toxic to fish and aquatic invertebrates. It is very toxic to bees and has a low toxicity to birds. Prallethrin is a yellow to yellowish-brown liquid that is practically insoluble in water. It photolyzes when exposed to sunlight, binds tightly to sediment suspended in the water column, and has low mobility in soil.

- Resmethrin

Resmethrin kills mosquitoes via direct contact and is non-selective. It interferes with the normal function of their nervous system. It is more toxic to insects than mammals because insects have a lower body temperature.

Resmethrin has a low toxicity to humans, regardless of the route of exposure. Dermal contact may result in stinging, burning, and numbness. Inhaling resmethrin may cause dizziness, nausea, and fatigue.

Resmethrin is primarily broken down by UV and has a half-life of 30 days. It binds tightly to soil and does not mix well with water, which make it unlikely to enter groundwater.

Resmethrin is very highly toxic to fish and aquatic invertebrates, in both fresh water and marine water environments. However, because it doesn't mix well in water, binds tightly to

soil, and breaks down in UV, the effects of resmethrin on fish and aquatic invertebrates is reduced. Resmethrin is also highly toxic to bees, but has a low to moderate toxicity to birds.

- Sumithrin (d-phenothrin)

Sumithrin kills mosquitoes via direct contact and is non-selective. It disrupts the transmission of nerve impulses by stimulating the nerve cells and eventually causing paralysis. Sumithrin would similarly impact the nervous system in mammals, except that mammalian nervous systems are less sensitive and recover more quickly. Mammals also have a higher body temperature, which reduces the effect of sumithrin.

When high doses of sumithrin are ingested by mammals, their liver and kidneys may be damaged. Cats and dogs are particularly susceptible to the impacts of sumithrin, when ingested. Other mammalian symptoms of exposure include dizziness, headache, fatigue, and diarrhea.

Sumithrin is very toxic to fish and aquatic invertebrates. It is also highly toxic to bees.

5.0 EXPLANATION OF PERMIT CONDITIONS

Permit conditions from the Mosquito General Permit are discussed below along with Ecology's rationale for the permit conditions.

5.1 Special Condition S1. Permit Coverage

Activities Covered Under This Permit

Washington's water quality regulations do not allow the discharge of pollutants to Waters of the State without permit coverage (RCW 90.48.080, 90.48.160, 90.48.260, and WAC 173-201A WAC). Algaecides, herbicides, insecticides, molluscicides, piscicides, and any other pesticide or product appropriate to manage aquatic species are potential pollutants, and therefore require a discharge permit before application to Washington State surface waters.

All entities that engage in mosquito control activities that result in the discharge of larvicides or adulticides to Waters of the State must have permit coverage. The discharges requiring permit coverage may be direct or indirect. For example, a direct discharge is the application of larvicides directly to surface water, while an indirect discharge is the settling of adulticides onto a surface water even though the water was not the target area.

Additionally, entities operating under federally-issued and state-issued experimental use permits (EUPs) must have coverage under the appropriate aquatic pesticide permit. The WSDA requires an EUP for all research experiments involving pesticides that are not federally registered or for research experiments involving pesticide uses not allowed on the FIFRA label. The EUPs are granted for the purpose of gathering data to support product registration in accordance with FIFRA Section 3 and Section 24(c).

Activities NOT Covered Under This Permit

The permit applies to all direct and indirect discharges of conditionally authorized active ingredients, to Waters of the State, with some exceptions. The exceptions were developed after careful consideration of information obtained from MCDs, industry representatives, Ecology staff, and representatives of other agencies.

Many of the scenarios listed in Special Condition S1.B include a holding time of two weeks following treatment. Ecology believes that the 2-week holding time sufficiently allows the pesticide products to dissipate before the treated water discharges to receiving waters. If the treated water is not discharged to receiving waters for two weeks, then the treatment should not violate the Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC).

Geographic Area Covered Under This Permit

The Mosquito General Permit applies to direct and indirect discharges of conditionally authorized active ingredients to Waters of the State anywhere in Washington where Ecology has authority (RCW 90.48.020, WAC 173-200-020, and WAC 173-226-030), with some exceptions. Ecology and the EPA agree that in certain instances, Ecology will issue aquatic pesticide permits for discharges on federal land (but not Indian Country). If the discharger is not a federal entity

and a federal entity did not make the decision that will cause the aquatic pesticides to be discharged, the appropriate Ecology permit will be used to cover the discharge on federal lands.

The draft permit does not apply to federal lands where the federal government is the decision maker and:

- Provides funding.
- Manages the land (determines what pesticides to use and when to apply them).
- Made the decision to apply pesticides.
- Is the entity applying pesticides.

In a letter from the EPA dated July 20, 2015, the EPA stated the following.

In Washington State, where a non-federal entity operates on federal lands as the decision-maker and applicator, they would need to obtain authorization to discharge under Washington State's aquatic pesticide permit and submit an NOI to the State and not submit an NOI to EPA. For example, a mosquito control district operates on federal lands as the decision-maker to apply pesticides, has control over when the application will occur, and has the ability to modify that decision. As a result, they are the decision-maker and would need to submit an NOI to the State for authorization under the State's aquatic pesticide permit, even though the application occurs on federal property.

Additionally, the draft permit does not apply to treatments that occur on “Indian Country” as defined in 18 U.S.C. §1151, except portions of the Puyallup Reservation, as noted in the draft permit.

5.2 Special Condition S2. Applying for Permit Coverage and Permit Administration

Ecology plans to issue this permit for a period of five years, starting on the effective date of the permit (WAC 173-226-330). Coverage under the permit will last from the date of coverage to the date of permit expiration.

Who Must Apply For Permit Coverage

A definition of “Permittee” is not provided in Chapter 90.48 RCW, Chapters 173-216, 173-220, or 173-226 WAC. Nor is one provided in 40 CFR 122 (EPA NPDES Permit Program) or State NPDES Permit Programs. Based on the usage of Permittee in federal and Washington State statute and regulation, Ecology understands the term “Permittee” to mean *“The entity that has applied to Ecology and been issued coverage under this general permit for a discharge of pollutants to waters of the State of Washington.”*

For this permit, Ecology established that the Permittee (the entity who must obtain permit coverage) is the aquatic or public health licensed pesticide applicator or a government entity (for example, a mosquito control district or a county agency). Government entities that are Permittees are their own sponsor, even if they contract with a commercial applicator for mosquito control services.

Commercial applicators who are Permittees must have a project sponsor for each permit coverage. Generally each coverage will have a single sponsor. This follows the model of the Aquatic Plant and Algae Management General Permit and ensures that the Permittee is applying larvicides and adulticides at the request of the entity who has authority to allow the activity to take place on the property.

How to Apply for Permit Coverage

A new applicant must submit a complete application to Ecology including a NOI, map of the proposed coverage area, and a completed and signed SEPA checklist (or SEPA determination if another entity is SEPA lead). In addition, if the applicant will use adulticides, they must develop an IPM plan before publishing the public notice. Ecology requires they submit their IPM plan so that the public has a chance to review and comment on the plan the Permittee will use to control mosquito populations.

Applicants must submit a complete application for permit coverage to Ecology a minimum of 60 days before applying larvicides or adulticides where a discharge will occur (RCW 90.48.170).

An official who has signature authority (WAC 173-226-200) for the entity applying for permit coverage must sign all documents. Ecology must receive the complete application for permit coverage on or before the publication date of the public notice the permit applicant posted in a newspaper of general circulation (WAC 173-226-130). Ecology considers a newspaper of general circulation as the major newspaper publication for a region.

When Ecology receives a new applicant's complete application before public notice it can review the application and communicate necessary changes on application documents. Communication (prior to publishing public notice) about document changes can save the applicant money by identifying any necessary changes (and the possible need to revise the public notice) before the applicant publishes and sends out the public notice.

The public has the opportunity to comment on the permit application and the proposed coverage during the 30 days after publication of the second public notice (public comment period) (WAC 173-226-130(4)). Ecology will consider comments about the applicability of the permit to the proposed activity received during this period. If Ecology receives no substantive comments, it may issue permit coverage on the 38th day following receipt of a complete application. Third parties have the right to appeal coverage decisions (WAC 173-226-190).

Modification for Permit Coverage

A Permittee may need to modify their permit coverage to adjust to new or changing circumstances. For example, a MCD could expand its boundaries. This is a change to the description of the discharge on the Permittee's NOI, and therefore, requires the Permittee to modify their permit coverage. In order to modify their permit coverage, the Permittee must:

- Submit an updated permit application.
- Publish a public notice once a week, for two consecutive weeks.
- Provide a 30-day comment period.

A Permittee applying to modify their permit coverage must provide a 30-day comment period because the public must have the opportunity to review and provide comments about the proposed permit modification. This requirement is the same for a new Permittee as well as an existing Permittee wanting to modify their permit coverage.

Permit modification also requires SEPA compliance. An additional SEPA review may be necessary if the proposed change falls outside of the scope of the initial SEPA evaluation.

How to Renew Permit Coverage

General permits are typically revised every five years. In order to continue their coverage under the revised general permit, Permittees must submit a renewal application to Ecology at least 180 days before the current version of the general permit expires (WAC 173-226-220). Coverage under an expired general permit for Permittees who fail to submit a timely and sufficient application will expire on the expiration date of the general permit. Ecology will consider any Permittee that does **not** reapply for coverage as a new applicant.

How to Transfer Permit Coverage

Section 210 of Chapter 173-226 WAC explains the process for transferring permit coverage from one party to another party. Transfer of permit coverage may occur when the applicator or sponsor covered by the general permit is transferred to a new applicator or sponsor. The old applicator or sponsor and the new applicator or sponsor must sign and submit a Transfer of Coverage Form to Ecology. This form standardizes the agreement between two parties to transfer the responsibility for complying with permit requirements (WAC 173-226-210).

Once the signed Transfer of Coverage Form is submitted to Ecology, the new applicator or sponsor becomes the Permittee and accepts all responsibility to comply with the terms and conditions of the general permit as well as liability and permit fees. The Permittee must pay the permit fees assessed by Ecology, as established by Chapter 173-224 WAC and RCW 90.48.465(1), unless coverage is terminated or revoked.

How to Terminate Permit Coverage

Section 160 of Chapter 90.48 RCW requires the owner/operator of a commercial or industrial facility to have a permit if they discharge waste materials to Waters of the State. The owner/operator of a facility with coverage under the Aquatic Mosquito Control General Permit must comply with the terms and conditions of the general permit unless they terminate coverage or transfer coverage to a new Permittee. In order to terminate coverage, the Permittee must demonstrate that they no longer have a discharge and submit a completed Notice of Termination form to Ecology. Requiring a demonstration that there is no longer a discharge ensures that facilities that discharge remain covered under permit (WAC 173-226-230).

5.3 Special Condition S3. Discharge Limits

Compliance with Standards

Ecology established water quality standards for Waters of the State in WAC 173-200, WAC 173-201A, and WAC 173-204, as authorized by Chapter 90.48.035 RCW. Any general permit issued by Ecology, in accordance with WAC 173-226-070, must prevent damages to Waters of the State and include conditions so that all authorized discharges meet Washington State Water Quality Standards.

The Washington State Water Pollution Control Act (Chapter 90.48 RCW) requires that all known, available, and reasonable methods must be used by industries and others to prevent and control pollution (AKART). Ecology determined that a Permittee will achieve AKART when they comply with:

- All permit conditions.
- Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).
- Sections 120 and 130 of the Washington State Fish and Wildlife Code (Chapter 77.15 RCW).
- Washington State Pesticide Application Act.
- Washington State Pesticide Control Act.
- Federal Insecticide, Fungicide, and Rodenticide Act.

Temporary Exceedance of Water Quality Standards

In 2006, Ecology updated the Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC), and included a short-term water quality modification provision. The draft permit includes the provision, which allows the larvicide discharges conditionally authorized by the draft permit to temporarily diminish some beneficial uses in the receiving water. This short-term modification only applies to short-lived (hours or days) impairments, but may occur throughout the permit term.

This provision allows a temporary exceedance of water quality standards for up to five years, the term of a general permit, provided the Permittee has followed certain guidelines. In order for Ecology to extend the exceedance for up to five years and to not limit the exceedance to hours or days, the Permittee must develop and implement an IPM plan (WAC 173-201A-410(2)). The Permittee must also comply with the public involvement requirements in the Administrative Procedures Act (Chapter 34.05 RCW) and complete a State Environmental Policy Act (chapter 43.21C RCW and chapter 197-11 WAC) review of the proposed activity.

Permittees who do not meet these requirements must ensure that the short-term exceedance of water quality standards is limited to only hours or days. Ecology may also request updated plans and addendums to existing plans.

Impaired Waterbodies

Ecology periodically reviews water quality data to determine if waterbodies meet state and federal criteria. Section 303(d) of the CWA requires that waters not meeting federal criteria are

evaluated to determine the cause of the contamination and amount of the contaminant in the waterbody. Ecology publishes these evaluations in Total Maximum Daily Load (TMDL) reports, and may establish effluent limits based on the waste load allocations in the reports.

Waterbodies across Washington are on the 303(d) list for many parameters. A search of the 303(d) database, see link included below, showed only one (1) waterbody as impaired for one (1) of the larvicides or adulticides conditionally authorized for use in the draft permit. According to the 303(d) database, the Blue Slough located in Lower Yakima County is listed as impaired for malathion. Ecology believes that further impairment is unlikely through activities permitted under the draft permit. (<https://fortress.wa.gov/ecy/approvedwqa/ApprovedSearch.aspx>)

5.4 Special Condition S4. Pesticide Use

Active Ingredients Authorized for Use

This section contains a list of the active ingredients that are conditionally authorized for use under the draft permit. The draft permit specifically lists the active ingredients because pesticide product formulations vary greatly and can change. Additionally, pesticide manufacturers frequently add new pesticides to the market. If the permit listed the trade name rather than the active ingredient, Ecology would need to revise the permit whenever pesticide manufacturers changed a product. Plus, the active ingredient is the primary chemical which causes toxic effects to target organisms. Focusing on the active ingredient instead of the trade name reduces the frequency of permit revisions.

For information about each active ingredient conditionally authorized for use under the draft permit, see Section 4.0 in this Fact Sheet.

Pesticide Application Requirements

The draft permit requires that Permittees comply with the FIFRA label and all applicable permit conditions. Coverage under the permit does not supersede or preempt federal or state pesticide label requirements or any applicable regulations. It is the Permittee's responsibility to determine what other regulations pertain to mosquito control activities, and to comply with those regulations (General Condition G2).

The draft permit does not convey any property rights, or any exclusive privileges. Nor does it authorize any injury to private property or invasion of personal rights. In some instances, Permittees may need to obtain permissions to access and treat private land (see RCW 17.10.160 - Right of Entry).

Pesticide Application Requirements

The draft permit specifies certain requirements for personnel that conduct treatments and personnel that calibrate the application equipment. For instance, all treatments authorized by the draft permit must be performed by, or supervised by, a licensed applicator. The draft permit also requires applicators and personnel that calibrate the application equipment, have up-to-date training.

Larvicide and Adulticide Requirements

To mitigate potential impacts to non-target species, the draft permit limits how and when larvicides and adulticides may be used. These restrictions may involve collecting a dip sample to determine if larvicidal treatment is necessary or knowing the history of the treatment site. Because adulticides are toxic to aquatic life, the draft permit restricts the use of adulticides to limit the indirect discharge to surface Waters of the State.

Some active ingredients may only be used in response to the development of pesticide resistance. The draft permit authorizes 18 active ingredients to control mosquito populations. However, over time and with repeated use of the same tool, mosquito populations can develop resistance, meaning the product no longer effectively kills mosquitoes. For this reason, the draft permit requires that the Permittee only use the larvicides malathion and temephos, and the adulticide deltamethrin, when mosquitoes have developed a resistance to pesticides.

Mosquitoes can develop resistance to a specific active ingredient or to a class of active ingredients. Permittees will have greater success controlling mosquito populations if they implement strategies to avoid the development of pesticide resistance. The EPA offers guidance for slowing and combating pest resistance to pesticides on their pesticide registration webpage at the following link. (<https://www.epa.gov/pesticide-registration/slowing-and-combating-pest-resistance-pesticides>)

Vulnerable Species

Active ingredients conditionally authorized for use by the draft permit may impact certain endangered, sensitive, threatened, or candidate species (vulnerable species). To reduce potential impacts to vulnerable species, Ecology and the WDFW developed a document titled “Areas of Restricted Larvicide and Adulticide Use Due to Presence of Vulnerable Species.” The document is available on the Aquatic Mosquito Control General Permit webpage, at the following link. (<https://ecology.wa.gov/mosquitopermit>)

This report provides criteria used by the WDFW to determine what species are “vulnerable species”, as well as a list of six species that met the criteria. The report also includes maps and aerial images that show areas where vulnerable species occur (areas of concern). Permittees that want to treat the areas of concern identified by the WDFW must meet additional planning and approval requirements to ensure that vulnerable species are protected.

The draft permit allows Permittees to apply *Bacillus sphaericus* or BTI in areas of concern without consulting the WDFW. However, if a Permittee wants to apply larvicides or adulticides other than *Bacillus sphaericus* or BTI, then they must:

- Develop an Areas of Concern plan detailing how they intend to manage mosquitoes in the area of concern.
- Obtain letters of concurrence from the WDFW and any impacted land management agencies.
- Describe their procedure for notifying the WDFW when treatments will occur.
- Submit the Areas of Concern plan to Ecology for review and approval.

Ecology will not approve the plan without concurrence from WDFW and the affected land management agency, if one exists.

Experimental Use

Larvicides and adulticides not authorized by the draft permit may be used if they are applied in research and development efforts related to the chemical control of mosquitoes, and in accordance with the requirements in Special Condition S4.C. One of the requirements is that the research and development project is covered by a federally-issued or state-issued experimental use permit (EUP).

The EPA regulates federal experimental use permits (EUPs) under Section 5(f) of FIFRA. In Washington, the WSDA regulates both state and federal EUPs under RCW 15.58.405(3). The WSDA requires an EUP for all research experiments involving pesticides that are not federally registered or for research experiments involving pesticide uses not allowed on the FIFRA label.

The WSDA EUPs limit the researcher's test area to one (1) acre or less of surface water per pest. When an experiment involves a test area of more than one (1) acre, the researcher must obtain coverage under a federal EUP as well as a state EUP. A federal EUP typically allows treatment on several hundred acres. The researcher must have coverage under both EUPs before initiating any shipment of pesticides to Washington. EUPs are typically valid for one (1) year.

5.5 Special Condition S5. Integrated Pest Management Plan

The draft permit requires that Permittees who apply adulticides, develop an Integrated Pest Management (IPM) plan. A Permittee who only applies adulticides may use the most recent version of Ecology's publication "Best Management Practices for Mosquito Control" (publication number 03-10-023), or equivalent, instead of developing an IPM plan.

Special Condition S5.B lists the required elements of the IPM plan. For instance, the IPM plan must include contact information for the person conducting the treatment, a map showing the treatment area, and procedures for reporting an emergency. Ecology modeled the required elements after similar requirements in the EPA's Pesticides General Permit (Section 5 – Pesticide Discharge Management Plan). Ecology wanted to ensure that the IPM plans contained the same information required by the EPA. The required elements of the IPM plan are also based on requirements in the Integrated Pest Management Law (Chapter 17.15 RCW) and the Washington's Water Quality Standards (WAC 173-201A-110).

5.6 Special Condition S6. Notification and Posting Requirements

The draft permit requires Permittees to provide a notice to the public about planned treatments to control mosquitoes. Special Condition S6 lists the information that Permittees are required to include in the public notice. For instance, the name of the larvicide or adulticide planned for use, the dates of the treatment, the location of the treatment, and contact information for the applicator.

The intent of any public notice is to make the public aware of activities taking place that may affect them. For various reasons, individuals in communities wish to limit their exposure to pesticides. For example, individuals may need the information because they are sensitive to chemicals, or because of lifestyle choices. All members of the public have the right to know when they are exposed to chemicals, so they can make informed decisions about limiting their exposure. The intent of this requirement is for the Permittee to inform the public about pesticides used for mosquito control.

Ecology adopted the requirements for public notice, posting, and legal notice of pesticide applications from previous public notification requirements in Ecology-issued orders and short-term modifications. Ecology based the public notification requirements on:

- The EPA FIFRA label requirements.
- The public's right to know.
- Best professional judgment.

5.7 Special Condition S7. Recordkeeping

Records Retention

The recordkeeping requirements in the draft permit are based on state authorities, which allow Ecology to specify any appropriate reporting and recordkeeping requirements to protect Waters of the State. (RCW 90.48, WAC 173-226-090 and WAC 173-226-180) Keeping records provides practical measures that allow the Permittee, public, and Ecology to assess compliance with the requirements of the general permit.

Permittees must keep all records and documents required by the general permit for five (5) years. If there is any unresolved litigation regarding the discharge of pollutants by the Permittee, they must extend the period of record retention through the course of the litigation. (WAC 173-226-190)

Access to Records

The draft permit requires that Permittees document information related to the use of larvicides and adulticides to control mosquitoes. Even though the Permittee is not required to submit all of this information to Ecology, they are required to provide the information when Ecology or members of the public request it. This information is one of the many controls that help limit impacts from discharges of larvicides and adulticides.

Monitoring

Ecology has the authority to require Permittees to monitor their activities covered by the permit that may impact Waters of the State. The following is a list of the applicable regulations that grant Ecology the authority to require monitoring.

- RCW 90.48.260
Ecology has the authority to establish inspection, monitoring, entry, and reporting requirements.

- WAC 173-220-210
Ecology has the authority to require monitoring of treated waters to determine the effects of discharges on surface Waters of the State.
- WAC 173-220-210
Ecology has the authority to require monitoring of the treated waters to determine the effects of discharges on surface Waters of the State.

With the exception of certain parameters (pH, temperature, alkalinity), Ecology requires that all monitoring data be analyzed and prepared by a laboratory registered or accredited for the active ingredient under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

5.8 Special Condition S8. Reporting

This section contains specific conditions based on Ecology's authority to specify appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-226-090).

Annual Report

The draft permit requires that Permittees submit an annual report that includes information about the treatments that occurred during the previous year. For example, Permittees must record the amount, in pounds, of each active ingredient used and the acreage treated. Permittees are required to submit the Annual Report to Ecology by December 31st each year.

Permittees that choose certain approaches to controlling mosquitoes must include additional information in their Annual Report. A Permittee that:

- Applies the larvicides malathion or temephos in response to the development of pesticide resistance must include additional information in their Annual Report.
- Applies the adulticide deltamethrin in response to the development of pesticide resistance must include additional information in their Annual Report.
- Applies pesticides in areas of concern must include additional information in their Annual Report.

In addition to demonstrating compliance with the permit, Annual Reports inform future permit revisions and help Ecology determine if pesticide use is increasing or decreasing.

Required Plans

All Permittees are required to submit Annual Reports. In addition to the Annual Report, two other submittals are required in certain situations.

An existing Permittee is required to reapply for permit coverage once the revised permit is effective. If the existing Permittee applies or decides to apply adulticides, they are required to submit their IPM plan as part of the complete application for coverage. An existing Permittee that only applies larvicides is not required to submit an IPM plan. These submittals inform future permit revisions and indicate if pesticide use is increasing or decreasing.

A Permittee that wants to apply pesticides in areas of concern, and they want to use pesticides other than *Bacillus sphaericus* or BTI, they must submit their Areas of Concern plan to Ecology. They must receive Ecology approval before applying pesticides other than *Bacillus sphaericus* or BTI in areas of concern. The WDFW identified areas of concern where vulnerable species are located. A Permittee intending to apply pesticides to an area of concern must consult the WDFW first to identify vulnerable species and determine how best to avoid impacts to those species. All of this information must be documented in the Permittee's Areas of Concern plan and then submitted to Ecology for approval.

Reporting Noncompliance and Spills

WAC 173-226-080(1)(d) states that a discharge of any pollutant more frequently, or at a level in excess of that authorized, is a permit violation. Ecology requires that if a Permittee violates permit conditions, they must take steps to stop the activity, minimize any violations, and report those violations to Ecology. For pesticide applications authorized in the permit, applicators must report violations to the Aquatic Mosquito Control General Permit Manager and the Regional Spills Hotline (ERTS Hotline) within 24 hours. This allows Ecology to determine if more action is necessary to mitigate the permit violation.

How to Submit Documents to Ecology

Ecology is transitioning to an online system for permit administration. All information and reports, including the application and reapplication for coverage, required for submittal to Ecology must be submitted electronically. The online system is expected to save time and resources for Permittees and Ecology (e.g., eliminating paperwork, data entry workload, database errors) while improving compliance and protection of water quality. It will also enhance transparency and public accountability, and provide a more consistent reporting framework for all Permittees.

If a Permittee is unable to submit information or reports electronically (for example, they do not have access to the internet), they must submit an Electronic Reporting Waiver form to Ecology. The Electronic Reporting Waiver allows a paper submittal option for certain small businesses that may not be able to use the online system.

5.9 General Conditions

General Conditions in the Aquatic Mosquito Control General Permit are based directly on federal and state laws and regulations that have been standardized for general permits issued by Ecology.

6.0 PUBLIC INVOLVEMENT

On March 6, 2019, Ecology published a public notice in the State Register and distributed the public notice via mail and electronic mail to interested parties and Permittees. Ecology uses public notices to inform the public that the draft permit, this Fact Sheet, the Economic Impact Analysis, the Notice of Intent, and the SEPA documents are available for review and comment.

Ecology will host two (2) workshops and hearings. During the workshops, Ecology will explain the proposed revisions and answer questions prior to the hearing. During the hearing, the public may give oral testimony and written comments on the permit. Written comments will receive the same consideration as oral testimony. Information about the workshops and hearings is included below.

Tuesday April 9, 2019, at 9:30 a.m.

Webinar Hearing

Ecology is offering this hearing via webinar². Click on the following link for instructions explaining how to join the webinar.

(<https://ecology.wa.gov/mosquitopermit>)

Wednesday April 10, 2019, at 10:00 a.m.

In-Person Hearing

Central Washington University,
Student Union & Recreation Center, Room SURC 137A,
1007 North Chestnut, Ellensburg, WA 98926.
For directions and parking instructions, click on the link.

(<https://ecology.wa.gov/mosquitopermit>)

Ecology will accept written comments on the draft permit, fact sheet, and supporting documents from March 6, 2019, until 11:59 p.m. on April 19, 2019. Ecology prefers the public submit comments through the comment form on the permit webpage. Comments should reference specific permit text when possible and may address the following.

- Technical issues.
- The adequacy of environmental protection and permit conditions.
- How the requirements may impact the regulated industry.
- The accuracy and completeness of the information.
- Any other concern that could result from the issuance of the revised permit.

Submit comments:

- Online via the e-Comment form: <http://ws.ecology.commentinput.com/?id=VfHgZ>
- By mail. Mail comments to Stacey Callaway at the Washington State Department of Ecology, PO Box 47696, Olympia, WA 98504-7696
- At the hearings listed above.

Ecology will make the final decision on the revised permit after we consider all public comments. If public comments cause a substantial change in the permit conditions from the original draft revised permit, we may provide another public notice of draft and comment period. Ecology expects to issue the revised general permit in the summer of 2019.

² Webinars are an online meeting forum that you can attend from any computer using internet access.

7.0 PERMIT ISSUANCE PROCEDURES

If necessary, Ecology may modify this permit to impose new or modified numerical limits to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters. Ecology would base this decision on new information obtained from sources such as inspections, effluent monitoring, or Ecology-approved engineering reports. Ecology may also modify this permit because of new or amended state or federal regulations.

The general permit meets all statutory requirements for authorizing a wastewater discharge, including those limits and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of Waters of the State of Washington. Ecology proposes to issue this general permit for five years.

Ecology tentatively determined to reissue the Aquatic Mosquito Control General Permit to cover discharges of larvicides and indirect discharges of adulticides to Waters of the State. If reissued, the proposed permit will replace the current permit (2015-2020).

8.0 APPEAL

The Aquatic Mosquito Control General Permit may be appealed to the Pollution Control Hearings Board (PCHB) within 30 days of the “date of receipt” of the final permit. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. “Date of receipt” is defined in RCW 43.21B.001(2).

An individual that wants to appeal the permit must:

- Submit the appeal and a copy of the permit to the PCHB, the address is included below.
- Submit a copy of the appeal and the permit to Ecology. The submittal must be in paper form and delivered via mail or in person to the address listed below.

Pollution Control Hearings Board

Street Address

1111 Israel RD SW
Suite 301
Tumwater, WA 98501

Mailing Address

Pollution Control Hearings Board
PO Box 40903
Olympia, WA 98504-0903

Washington State Department of Ecology

Street Address

Attn: Appeals Processing Desk
300 Desmond Drive SE
Lacey, WA 98503

Mailing Address

Department of Ecology
Attn: Appeals Processing Desk
PO Box 47608
Olympia, WA 98504-7608

9.0 ECONOMIC IMPACT ANALYSIS

The Economic Impact Analysis will be included for the issuance of the Aquatic Mosquito Control General Permit. The Economic Impact Analysis will also be available on the webpage for the Aquatic Mosquito Control General Permit for the issuance of the permit.

(<https://ecology.wa.gov/mosquitopermit>)

APPENDIX A

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97. Suffolk County New York Environmental Risk Assessment. [Classification: 10]

APPENDIX B

RESPONSE TO COMMENTS

The response to comments will be available on the webpage for the Aquatic Mosquito Control General Permit for the issuance of the permit.
(<https://ecology.wa.gov/mosquitopermit>)