



DEPARTMENT OF
ECOLOGY
State of Washington

Economic Impact Analysis

*Draft Aquatic Mosquito Control National
Pollutant Discharge Elimination System
(NPDES) General Permit*

March 2015
Publication no. 15-10-003

Publication and Contact Information

This report is available on the Department of Ecology's website at <http://www.ecy.wa.gov/biblio/1510003.html>

For more information contact:

Water Quality Program
P.O. Box 47600
Olympia, WA 98504-7600

Phone: 360-407-6401

Washington State Department of Ecology - www.ecy.wa.gov

- Headquarters, Olympia 360-407-6000
- Northwest Regional Office, Bellevue 425-649-7000
- Southwest Regional Office, Olympia 360-407-6300
- Central Regional Office, Yakima 509-575-2490
- Eastern Regional Office, Spokane 509-329-3400

To ask about the availability of this document in a format for the visually impaired, call the Water Quality Program at 360-407-6401. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Economic Impact Analysis
DRAFT AQUATIC MOSQUITO CONTROL
NPDES GENERAL PERMIT

Prepared by

Shon Kraley, Ph.D.

for the

Water Quality Program
Washington State Department of Ecology
Olympia, Washington

This page is purposely left blank.

Table of Contents

List of Tables	ii
Chapter 1: Overview and Results	1
1.1 Requirements of the general permit	2
1.2 Costs to comply with the draft general permit	2
1.3 Mitigation for small businesses	3
Chapter 2: Background.....	4
Chapter 3: Compliance Requirements	5
3.1 Permit coverage	6
3.2 Application for coverage.....	7
3.3 Discharge limits	9
3.4 The application of products	10
3.5 Notification and posting requirements	10
3.6 Monitoring requirements	11
3.7 Reporting and recordkeeping.....	11
Chapter 4: Estimated Costs of Compliance.....	12
4.1 Application for Permit.....	12
4.2 Permit coverage and Application of products	13
4.3 Notification and posting requirements	13
4.4 Monitoring requirements	13
Chapter 5: Conclusion of Estimated Costs and Possible Mitigation	14
Works Cited	Error! Bookmark not defined.

List of Tables

Table 1: Summary of additional compliance costs.....	3
Table 2: Expected permitted businesses by number of employees	3
Table 3: Summary of additional compliance costs.....	14

Chapter 1: Overview and Results

This analysis is a companion document to the draft Aquatic Mosquito Control National Pollutant Discharge Elimination System (NPDES) General Permit (permit). The general permit covers all mosquito control activities that result in a discharge of larvicides or indirect discharge of adulticides to waters of the state of Washington. 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.

The Department of Ecology (Ecology) proposes to issue the general permit so dischargers operating under coverage of this general permit will comply with the Federal Clean Water Act (CWA) and with the Washington Water Pollution Act (Revised Code of Washington (RCW) 90.48.080). Ecology's Waste Discharge General Permit Program rule (Washington Administrative Code (WAC) 173-226-120) requires an economic analysis of any draft wastewater general permit intended to directly cover small businesses. This analysis is required to serve the following purposes:

- A brief description of the compliance requirements of the draft general permit.
- The estimated costs for complying with the general permit, based on existing data for facilities to be covered under the general permit.
- A comparison, to the greatest extent possible, of the cost of compliance for small businesses, with the cost of compliance for the largest ten percent of businesses to be covered under the general permit.
- Discuss what mitigation the general permit provides to reduce the effect on small businesses (if a disproportionate impact is expected), without compromising the mandated intent of the general permit.

The Regulatory Fairness Act (RCW 19.85.020(3)) defines a small business as any business entity, including a sole proprietorship, corporation, partnership, or other legal entity, that is owned and operated independently from all other businesses, that has fifty or fewer employees.

This analysis does not include benefits or environmental impacts. It only estimates the additional costs borne by expected permittees resulting from compliance with the requirements of the general permit.

1.1 Requirements of the general permit

Since 2001, and based on *Headwaters v. Talent Irrigation District*, Ecology has managed the discharge of pesticides to waters of the state under NPDES). 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 NPDES coverage. This decision means that NPDES permitting is required for all aquatic pesticide applications throughout the United States.

This general permit covers mosquito control activities that result in a discharge of larvicides or indirect discharge of adulticides to waters of the state of Washington¹. Ecology proposes to issue this general permit so 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 relevant baselines (the relevant regulation if this general permit did not exist) include existing federal and state regulations, discussed in more detail in Section 3. We analyze the additional costs resulting from the general permit that are more stringent than those in the federal regulation or other state laws and regulations, comparing Ecology's general permit to a baseline of no previous general permit.

1.2 Costs to comply with the draft general permit

A summary of the costs to comply with the draft general permit, attributable to Ecology's discretion, is shown below. Discretion refers to the requirements Ecology chose to include in the general permit. This analysis examines the requirements Ecology chose that are more stringent than the baseline, because the more stringent regulatory requirements apply. We compare Ecology's general permit to a baseline of no general permit, as described in Section 3.

¹ This permit does not apply to homeowner use of pesticides for residential control of mosquitos.

Table 1: Summary of additional compliance costs

Permit requirements (per business)	Per year average	5-year total, discounted ²
Initial Public newspaper notice	\$51 - \$63	\$51 - \$63
Creation of Integrated Pest Management Plan (IPM)	\$166 - \$332	\$166 - \$332
Creation of Plan for Vulnerable Species Habitat	\$1,103	\$1,103
Initial Public newspaper notice	\$51 - \$63	\$51 - \$63
Annual Public Notice (if using newspaper)	\$25 - \$32	\$124 - \$154
Posting signs	\$10	\$49

The general permit may impose disproportionately larger costs on smaller businesses. The compliance costs we estimate do not vary by business size. Each business expected to be covered by the general permit incurs the same constant compliance costs.

These costs are over a 5-year period, discounted at an annual rate of 1.32 percent.

Table 2: Expected permitted businesses by number of employees

Employees	Number of Businesses	Average number of employees
Fewer than 50	6	22
50 or more	1	122

1.3 Mitigation for small businesses

There are currently no exemptions specifically for businesses with fewer than 50 employees. Ecology does include, however, mitigation opportunities for all businesses.

Businesses are required to post public notices annually when they are going to spray. While this activity could be done through newspapers, businesses are also given the option of using web-notification, which would eliminate this cost.

An IPM plan is only required when permittees want to use adulticides. If only larvicides are proposed for use, then the permittee can adopt the Best Management Practices document developed by Ecology. This saves the permittee the cost of developing an IPM plan if they are only using larvicides.

² Ecology uses a discount rate based on interest earned risk-free on today's dollars over the relevant time period, the twelve-year average rate of return on the US Treasury's T-Bills (inflation-indexed short-term bonds; US Treasury Department, 2014) as the discount rate, averaging 1.32 percent.

When operating in areas identified as vulnerable species habit, a permittee must develop a plan that is reviewed and approved by Ecology and requires concurrence from WDFW and the affected land management agency if one exists. As an alternative to creating this plan, the permittee may use Bacillus based larvicide. This would save the cost of developing a plan.

Chapter 2: Background

The Federal Clean Water Act (CWA) sets water quality goals for navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the CWA is the NPDES permits, which the EPA administers. The EPA has delegated responsibility for administering the NPDES permit program in the state of Washington to the state (Ecology). The delegation of authority is based on chapter 90.48 RCW, which defines Ecology's authority and obligations in administering the NPDES permit program. Ecology also directly implements the federal regulations when developing state NPDES permits.

All permittees covered under a general permit receive the same permit conditions. This reduces the overall workload associated with writing and administering general permits.

This analysis does not include benefits to the people of Washington State (such as environmental or economic benefits). This analysis also does not include environmental impacts. This analysis only estimates the costs borne by expected permittees resulting from compliance with requirements of the general permit.

The Federal Insecticide, rodenticide and Fungicide Act (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. 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.

Any person wishing to apply pesticides to waters of the state must obtain an aquatic pesticide applicator license from WSDA or operate under the supervision of an aquatic licensed pesticide applicator.

Based on the *Headwaters, Inc. v. Talent Irrigation District*³ court decision, Ecology, with advice from the Washington State Office of the Attorney General, determined all pesticide applications to state surface waters required coverage under NPDES permits. Ecology issued its first NPDES general permits for pesticide applications to Washington's surface waters in 2002.

EPA issued its general permit on October 31, 2011, for the discharge of pesticides to manage:

- Aquatic plants and algae.
- Aquatic animals.
- Mosquitoes and flying insects.
- Forest canopy pests.

In Washington, EPA's general permit covers aquatic pesticide activities conducted on:

- Federal facilities.
- Federal lands when federal entities conduct or authorize the treatment.
- Tribal facilities and lands.

The state regulates aquatic pesticide application to all other lands/waters.

Chapter 3: Compliance Requirements

WAC 173-226-120 describes the costs that Ecology is required to examine in this economic impact analysis. However, there are certain requirements Ecology does not include in the analysis, and these requirements are discussed in this section.

The baseline is the regulatory context in the absence of the proposed general permit.

When adopting a general permit, at a minimum, Ecology must meet federal requirements. Ecology must also meet any state rules. The baseline is therefore one of no permit – we will compare the additional compliance costs as a result of requirements of the general permit to a state of the world where the general permit does not exist.

In the absence of a general permit, permittees are still required to comply with federal and other state regulations. If the general permit requirements are not more stringent than the federal requirements or other state laws and regulations, they are not considered as additional costs in this economic impact analysis because the cost of complying with federal or state law would be incurred regardless.

This general permit, then, is not responsible for those costs.

³ For a full discussion of Aquatic Pesticide legal history as it pertains to the current permit, please see *Draft Aquatic Mosquito Control NPDES Fact Sheet*, available on the permit website http://www.ecy.wa.gov/programs/wq/pesticides/final_pesticide_permits/mosquito/index.html.

As such, this economic impact analysis will only analyze the additional costs resulting from the general permit that are more stringent than those in the federal regulation or other state laws and regulations relative to the baseline. Pertinent standards set in state and federal law/rule include:

- Water Quality Standards for Surface Waters of the State of Washington (chapter 173-201A WAC).
- Ground Water Quality Standards (chapter 173-200 WAC).
- Sediment Management Standards (chapter 173-204 WAC).
- Whole Effluent Toxicity Testing and Limits (chapter 173-205 WAC).
- Human health based criteria in the National Toxics Rule (40 CR 131.36).
- National Primary Drinking Water Regulations (40 CFR chapter 1, Part 141).
- Group A Public Drinking Water Supplies Source Water Protection and Maximum Contaminant Levels (WACs 246-290-135 and 246-290-310).
- Federal Insecticide, Fungicide, and Rodenticide Act laws and labels.
- The Washington Pesticide Control Act (chapter 15.58 RCW).
- The Washington Pesticide Application Act (chapter 17.21 RCW).
- The State Environmental Policy Act (chapter 187-11 WAC).

Discharges not in compliance with the above standards are not authorized.

3.1 Permit coverage

The draft permit covers the discharge of larvicides and the incidental discharge of adulticides to water bodies in Washington. 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.

The Permit authorizes the discharge of several larvicidal active ingredients when an entity is working to control mosquitoes. The active ingredients included for use in the permit are:

- *Bacillus sphaericus* (H-5a5b).
- *Bacillus Thuringiensis israelensis*.
- Methoprene.
- Monomolecular surface films.
- Parrafinic white mineral oil.
- Spinosad.
- Malathion.
- Temephos.

The Permit authorizes the incidental discharge of several adulticide active ingredients. The active ingredients included for use in the permit are:

- Etofenprox.
- Malathion.
- Prallethrin.
- Permethrin.
- Resmethrin.
- Sumithrin (d-phenothrin).
- Natural Pyrethrins.
- Naled.
- Piperonyl Butoxide (PBO).

Baseline: No discharge of pollutants to waters of the state (RCW 90.48.080, 90.48.160, 90.48.260, and WAC 173-201A WAC). Larvicides and adulticides are potential pollutants.

Change: Allow the discharge of several larvicidal active ingredients and incidental discharge of several adulticide active ingredients.

Cost: None.

3.2 Application for coverage

The general permit requires applicants to submit a complete application for permit coverage to Ecology a minimum of 60 days before applying larvicides or adulticides where a discharge will occur. Ecology also allows public comment for 30 days after publication of the second public notice, and will issue permit coverage on the 38th day following receipt of the complete application. The permit will expire after 5 years, and the permittee will also incur an annual permit fee.

The completed application must include:

- A Notice of Intent (NOI).
- A map of the proposed coverage area.
- A completed and signed State environmental policy act (SEPA) checklist (or SEPA determination if another entity is SEPA lead).

In addition, if the applicant will be using adulticides, it must develop an IPM plan⁴ before publishing public notice.

RCW 90.48.170 requires applicants to submit a complete permit application a minimum of 60 days before application. WAC 173-226-130(3)(b) provides for a period of public comment during the 30 days after publication of the second public notice, and WAC 173-226-190 provides the right to appeal any coverage decision by the public.

WAC 173-226-220 specifies general permits shall be issued for fixed terms not exceeding five years from the effective date, and WAC 173-224-040 specifies the permit fee schedule by category, in dollars per year.

Permittees must also make adulticide application area maps available to the public and publish public notice in the local newspaper when they first apply for permit coverage, twice, one week apart, for two consecutive weeks.

For mosquito control activities in areas identified as vulnerable species habitat, the Permittee must develop a plan for the management of mosquitoes within the area of concern or limit their mosquito control discharge to the use of *Bacillus sphaericus* and Bti based larvicides. Plan requirements are specified in Special Condition S4.B.6 in the permit. The plan must be submitted to Ecology for review and approval. Ecology's approval is required prior to the use of larvicides and adulticides in areas containing vulnerable species. Ecology will not approve the plan without concurrence from WDFW and the affected land management agency, if one exists.

The costs associated with these requirements are estimated below (see section 4).

Baseline: Existing rules require applicants submit their complete application a minimum of 60 days before applying the larvicide or adulticide, a period of public comment, and expiration of the permit after 5 years. Existing rule also specifies both the requirement and amount of the annual permit fee.

Change: RCW 90.48.170 requires an application to include relevant information deemed necessary by the department. Therefore, this relevant information is up to the discretion of the department and should be included in this analysis. This includes the creation of a map of the proposed coverage area, completion of the SEPA checklist and, if the applicant will be using adulticides, development of an IPM plan. Further, if the applicant will be operating in areas identified as vulnerable species habitat, the Permittee must develop a plan for the management of mosquitoes within the area of concern or limit their mosquito control discharge to the use of *Bacillus sphaericus* and Bti based larvicides.

⁴ For a full discussion of IPM plans, please see *Draft Aquatic Mosquito Control NPDES Fact Sheet*, available on the permit website

http://www.ecy.wa.gov/programs/wq/pesticides/final_pesticide_permits/mosquito/index.html.

Cost: Cost of creating IPM plan if the applicant is using adulticides. Cost of development of plan to operate within area of vulnerable species habitat if necessary. Cost of publishing public notice in the local newspaper when they first apply for permit coverage, twice, one week apart, for two consecutive weeks.

3.3 Discharge limits

The permittee must comply with standards. The application of larvicides and adulticides must not cause or contribute to a violation of the:

- Water Quality Standards for Surface Waters of the State of Washington (chapter 173-201A WAC).
- Ground Water Quality Standards (chapter 173-200 WAC).
- Sediment Management Standards (chapter 173-204 WAC).
- Human health based criteria in the National Toxics Rule (40 CR 131.36).
- Federal Insecticide, Fungicide, and Rodenticide Act laws and labels.
- The Washington Pesticide Control Act (chapter 15.58 RCW).

Permittees must also comply with all other applicable federal and state laws. Requirements for discharge limits are mandated by existing federal and state regulations.

Baseline: Permittees must comply with applicable federal and state laws.

Change: None.

Cost: None.

3.4 The application of products

The general permit allows the use of certain active ingredients in larvicides and adulticides. Ecology permits active ingredients because pesticide product formulations vary, can change, and new products can be introduced. By using active ingredients, Ecology does not need to maintain a list of pesticide products and modify the permit when changes to the product occur. The active ingredient is also the primary chemical which causes toxic effects to target organisms.

Baseline: No use of the specified active ingredients in larvicides and adulticides are permitted.

Change: The use of certain active ingredients in larvicides and adulticides is permitted.

Cost: None.

3.5 Notification and posting requirements

The draft permit requires applicators to post notices at all reasonable points of public access to the treatment areas when applying larvicides with water use restrictions as identified by the FIFRA product label. Permittees must also make adulticide application area maps available to the public.

Permit Section S6.A.1 requires public notice of mosquito control activities and allows for notice to occur through the Permittee's website or through newspaper publication. This notice occurs annually to notify the public about proposed mosquito control activities for the year.

The costs associated with these requirements are estimated below (see section 4).

Baseline: No requirement for public posting.

Change: Require public posting at all reasonable points of public access the treatment areas site and public notice about proposed mosquito control activities for the year.

Cost: Cost of annual public notice and shoreline postings.⁵

⁵ Estimated in section 4.

3.6 Monitoring requirements

Permittees with coverage under the permit must record the amount of pesticides they use and report the number of pounds of active ingredient used and the acreage treated to Ecology in an annual report. In addition, for larvicide use, the Permittee may need to take dip samples to ensure there are mosquito larvae present before treating.

Baseline: No requirement for monitoring.

Change: Require monitoring, and take dip samples where necessary.

Cost: Cost of dip sampling.

3.7 Reporting and recordkeeping

Permittees meet part of their reporting requirements through annual treatment reporting. Permittees must submit their annual treatment report by December 31 of each year. The annual report summarizes the amount of each active ingredient (in pounds) used during the course of each treatment season per coverage. Applicators must keep all records and documents required for this permit for five years.

WAC 173-226-090 requires applicators to periodically submit reports. Ecology believes annual reporting is a periodic report. There is a potential cost savings in submitting reports less often. Ecology believes this cost savings is minimal at best (and would be comprised of less postage over a five-year period). Costs associated with recording the amount of active ingredient applied, and the number of acres and location(s) of acreage treated, as well as monitoring, are describe in section 4.4 (monitoring).

WAC 173-226-090(2)(c) requires applicators to keep all records and documents for five years.

Baseline: Permittees must meet part of their reporting requirements through periodic reporting. Permittees must keep all records and documents required by this permit for five years.

Change: None.

Cost: None.

Chapter 4: Estimated Costs of Compliance

This EIA estimates the costs of complying with the draft general permit for application of aquatic mosquito control larvicides and adulticides. It also compares the costs of complying with the draft general permit for small businesses to the costs of compliance for large businesses, to determine whether the requirements of the draft general permit disproportionately impact small businesses.

The scope of the analysis includes only the direct compliance costs imposed by the draft general permit to the expected permittees. Ecology is not required to evaluate benefits in an EIA and does not do so in this document.

The Regulatory Fairness Act (RCW 19.85.020(3)) defines a small business as any business entity, including a sole proprietorship, corporation, partnership, or other legal entity, that is owned and operated independently from all other businesses, and that has fifty or fewer employees. Of the seven currently permitted businesses, six have fewer than 50 employees, with an average of 22 employees. One has a total of 122 employees.

4.1 Application for Permit

During the application process, if the applicant intends to use adulticides, they are required to prepare an IPM plan. This process is anticipated to occur in house. However, if the work was hired out, it is estimated that the process would take the equivalent of an Environmental Specialist ³⁶ 8 to 16 hours at an hourly rate of \$27.57. This yields a one-time cost of \$220 to \$441.

For mosquito control activities in areas identified as vulnerable species habitat, the Permittee must develop a plan for the management of mosquitoes within the area of concern or limit their mosquito control discharge to the use of *Bacillus sphaericus* and Bti based larvicides. If the applicant chooses to develop a plan, it is estimated that the process would take the equivalent of an Environmental Specialist ³⁷ 40 hours at an hourly rate of \$27.57. This yields a one-time cost of \$1,103.

The permittee must also publish a public notice at the time of application for two consecutive weeks. This results in 2 total public notices over the 5-year period. We obtained estimates for the cost of public notice from a local and regional newspaper, of \$63 and \$51 per year.

⁶ State of Washington job classification ES3, range 49 step F. We make this assumption based on program experience. This hourly rate includes overhead.

⁷ State of Washington job classification ES3, range 49 step F. We make this assumption based on program experience. This hourly rate includes overhead.

4.2 Permit coverage and Application of products

The permit expands the universe of larvicides and adulticides permittees are allowed to apply. Although the general permit could have included additional active ingredients, compared to the baseline of no larvicides and adulticides permitted, the universe permitted has strictly increased. We therefore estimate no additional compliance costs as a result of this limitation.

4.3 Notification and posting requirements

In order to comply with the general permit, applicators must post notices at all reasonable points of public access to the treatment areas when applying larvicides with water use restrictions to water bodies as identified by the FIFRA product label. Permittees must also make adulticide application area maps available to the public.

We assume each sign is 7 x 5 inches and costs \$0.55 each, and a 1 x 1 x 36 inch bundle of 50 grading stakes costs \$25 dollars a bundle. The cost of posting one sign at one point of public access is estimated to be \$2. Sites with multiple points of public access will have more postings and greater cost accordingly. If we assume applicators need to post 5 signs, this yields an annual cost of \$10, or \$48.71 over the 5-year period, discounted, assuming they post signs in all 5 years.

The applicator must post public notice about proposed mosquito control activities for the year on an annual basis. This notification can occur through web notification or through the newspaper. If a newspaper is used, the costs would be \$25-\$32 annually or \$124 - \$154 over the 5-year period, discounted.

4.4 Monitoring requirements

Monitoring consists of recording the amount of active ingredient applied, and the number of acres treated. Permittees may also need to take dip samples if applying larvicides to ensure larve are present.

Costs for recording and dip-monitoring are minimal⁸.

⁸ In situations where dip-monitoring is necessary, it is assumed that the permittee would not mobilize their equipment unless they knew that larva were present.

Chapter 5: Conclusion of Estimated Costs and Possible Mitigation

This EIA compares the costs of compliance for small and large businesses to determine if the general permit disproportionately impacts small businesses. Ecology compares costs by looking at the cost per employee, where businesses with fewer than 50 employees are considered small businesses. We also show the total impact to businesses by compliance costs below.

Table 3: Summary of additional compliance costs

Permit requirements (per business)	Per year average	5-year total, discounted ⁹
Initial Public newspaper notice	\$51 - \$63	\$51 - \$63
Creation of Integrated Pest Management Plan (IPM)	\$166 - \$332	\$166 - \$332
Creation of Plan for Vulnerable Species Habitat	\$1,103	\$1,103
Initial Public newspaper notice	\$51 - \$63	\$51 - \$63
Annual Public Notice (if using newspaper)	\$25 - \$32	\$124 - \$154
Posting signs	\$10	\$49

The general permit would impose disproportionately larger costs on smaller businesses. The compliance costs we estimate do not vary by business size. Each business expected to be covered by the general permit incurs the same constant compliance costs. Since proportionality is determined by cost per employee, and the costs do not vary by business size, it necessarily must be disproportional.

Below we illustrate mitigation of these costs on small businesses where it was both legal and feasible to do so. If a proposed mitigation measure violates federal or state regulations, it cannot be undertaken.

There are currently no exemptions for businesses with fewer than 50 employees. There are included, however, mitigation opportunities for all businesses.

⁹ Ecology uses a discount rate based on interest earned risk-free on today's dollars over the relevant time period, the twelve-year average rate of return on the US Treasury's T-Bills (inflation-indexed short-term bonds; US Treasury Department, 2014) as the discount rate, averaging 1.32 percent.

Factors that mitigate disproportionate costs:

- An IPM plan is only required when permittees want to use adulticides. If only larvicides are proposed for use, then the permittee can adopt the Best Management Practices document developed by Ecology. This saves the permittee the cost of developing an IPM plan if they are only using larvicides.
- Businesses are required to post public notices annually when they are going to spray. While this activity could be done through newspapers, businesses are also given the option of using web-notification, which would eliminate this cost.
- When operating in areas identified as vulnerable species habit, a permittee must develop a plan that is reviewed and approved by Ecology and requires concurrence from WDFW and the affected land management agency if one exists. As an alternative to creating this plan, the permittee may use Bacillus based larvicide. This would save the cost of developing a plan.

Works Cited

At the end of each citation is a number in brackets identifying which of the citation categories below the sources of information belongs. (RCW 34.05.272).

Citation Categories	
1	Peer review is overseen by an independent third party.
2	Review is by staff internal to Department of Ecology.
3	Review is by persons that are external to and selected by the Department of Ecology.
4	Documented open public review process that is not limited to invited organizations or individuals.
5	Federal and state statutes.
6	Court and hearings board decisions.
7	Federal and state administrative rules and regulations.
8	Policy and regulatory documents adopted by local governments.
9	Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under other processes.
10	Records of best professional judgment of Department of Ecology employees or other individuals.
11	Sources of information that do not fit into one of the other categories listed.

1. US Treasury Department. (2014). http://www.treasurydirect.gov/indiv/research/indepth/ibonds/res_ibonds_iratesandterms.htm. Retrieved from Rates and Inflation for I-Bonds, 1998-2013. [10]
2. WA State Employment Security Department. (2014). *Workforce Explorer*. Retrieved from www.workforceexplorer.com [10]