Small Business Economic Impact Analysis

Fresh Fruit Packing Industry

National Pollution Discharge Elimination System (NPDES) Wastewater Discharge General Permit

By

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For the

Water Quality Program

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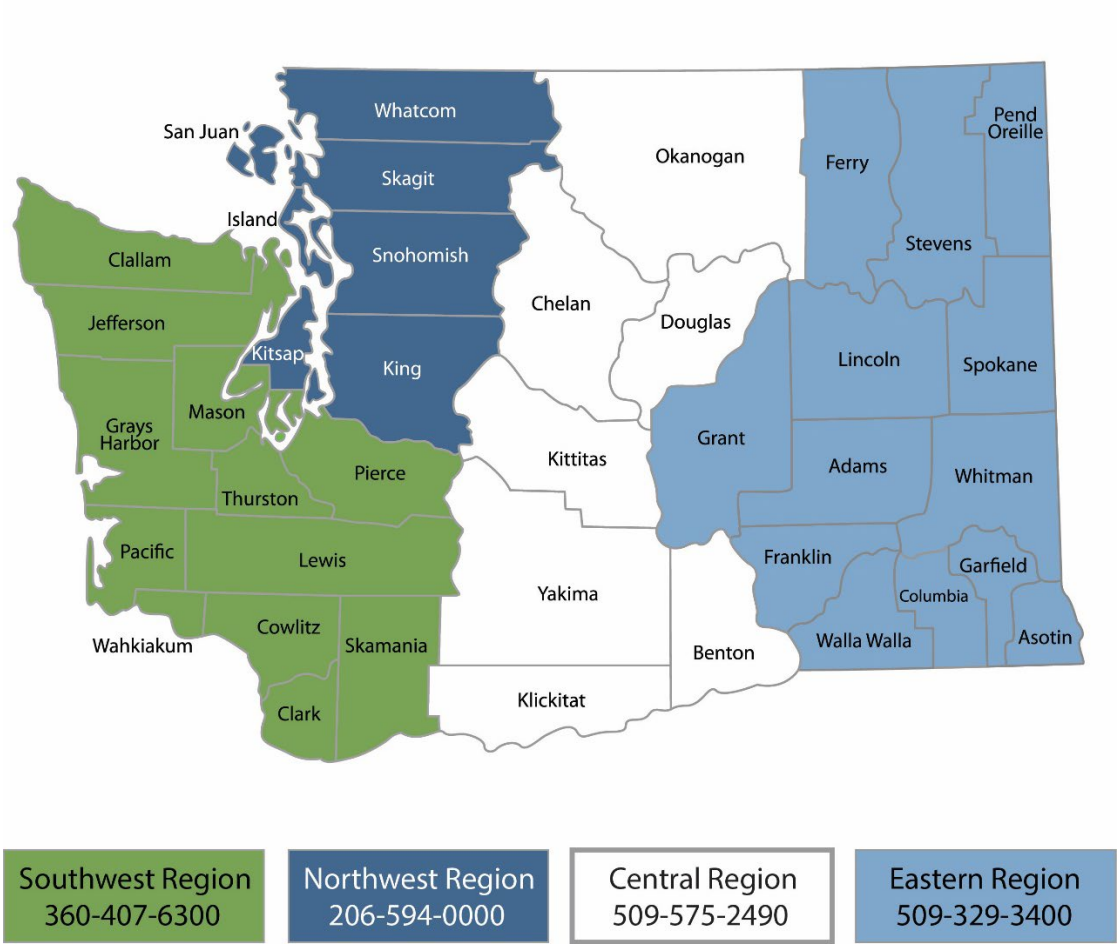

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Tables

Acronyms

ADMR	Annual Discharge Monitoring Report
AKART	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
BMP	Best Management Practices
DPA	Diphenylamine
ECP	Environmental Compliance Plan
EIA	Economic Impact Analysis
FWPCA	Federal Water Pollution Control Act
HDPE	High-density Polyethylene
NAICS	North American Industry Classification System
NPDES	National Pollutant Discharge Elimination System
POTW	Publicly Owned Treatment Works
RCW	Revised Code of Washington
RMP	Road Management Plan
SOPP	Sodium Orthophenylphenate
SPM	Spill Prevention Method
SWMM	Solid Waste Management Method
SWPPM	Stormwater Pollution Prevention Method
TDOM	Treatment/Disposal Operations Method
TDM	Treatment and Disposal Methods
WAC	Washington Administrative Code

Executive Summary

This Small Business Economic Impact Analysis (SBEIA) estimates the costs of complying with the Fresh Fruit Packing General Permit ("permit"). It compares the costs of complying with the permit for small businesses to the costs of compliance for the largest 10 percent of businesses, to determine whether the permit disproportionately impacts small businesses. This analysis is required by state rule in Washington Administrative Code (WAC) 173-226-120,[2] which directs Ecology to determine if the permit imposes disproportionate burden on small businesses, and if it does, to mitigate the disproportion to the extent that is legal and feasible.

WAC 173-226-120 requires the SBEIA to include:

- A brief description of the compliance requirements of the general permit.
- The estimated costs of complying with the permit, based on existing data for businesses intended 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 10 percent of businesses intended to be covered under the permit.
- A summary of how the permit provides mitigation to reduce the effect on small businesses (if a disproportionate impact is expected), without compromising the mandated intent of the permit.

For the purposes of the SBEIA, a small business is an independent entity with 50 or fewer employees. Government enterprises are excluded. Employment is typically based on the highest available level of ownership data.

Every new or existing commercial fresh fruit packing facility in Washington that receives, packs, stores, or ships hard or soft fruit must get coverage under this general permit or under an individual permit.

Washington's fresh fruit packing facilities primarily process apples, cherries and pears. Most facilities are located in the central region of the state along the Columbia, Okanogan, Wenatchee, and Yakima rivers. Currently, about 165 fresh fruit packing facilities – owned by 80 businesses – are covered under this permit.[3]

Fruit packing has six basic waste streams including:

1. Drencher
2. Float tank
3. Flumes

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[22] Chapter 173-226 WAC Waste Discharge General Permit Program
https://apps.leg.wa.gov/wac/default.aspx?cite=173-226

[3] 14 facilities have permits that are currently inactive. For purposes of this analyses, they are included in the analysis and treated like the facilities with active permits.

4. Non-contact cooling water
5. Process lines (wash, rinse, pack) and cleanup
6. Stormwater

Costs were estimated under five scenarios describing common situations in the fresh fruit packing industry.

Table i: Annualized Costs for Small and Large Businesses by Cost Scenario

Scenario	Small Businesses	Large Businesses
1A	$ 28,502 – 34,412	$ 39,069 – 54,281
1B	$ 26,193 – 32,104	$ 36,681 – 51,893
2A	$ 18,191 – 23,429	$ 21,674 – 29,596
2B	$ 15,882 – 21,120	$ 19,286 – 27,208
3A	$ 19,389 – 26,970	$ 22,872 – 33,137
3B	$ 17,080 – 24,662	$ 20,484 – 30,749
4	$ 24,996 – 30,907	$ 35,485 – 50,696
5	$ 2,556 – 4,576	$ 3,495 – 5,514

Table ii: Annualized Costs per employee for Small and Large Businesses by Cost Scenario

Scenario	Small Businesses	Large Businesses
1A	$ 3,353 – 4,048	$ 19.04 – 25.06
1B	$ 3,082 – 3,777	$ 16.94 – 23.96
2A	$ 2,140 – 2,756	$ 10.01 – 13.66
2B	$ 1,868 – 2,485	$ 8.90 – 12.56
3A	$ 2,281 – 3,173	$ 10.56 – 15.30
3B	$ 2,009 – 2,901	$ 9.46 – 14.20
4	$ 2,941 – 3,636	$ 16.38 – 23.41
5	$ 301 - 538	$ 1.61 – 2.55

The cost-per-employee ratios fall as the number of employees increases. Ecology concluded, based on this result, that **the general permit has a disproportionate impact on small businesses**.

In general, the permit's impact on small fresh fruit packing facilities cannot be mitigated significantly. Because many facilities are small businesses, the economic impact of the general permit on small businesses cannot be significantly reduced without reducing the effectiveness of the general permit in controlling water pollution.

Ecology has taken the following actions to mitigate the compliance cost impact of the permit. These actions were taken during the development of the permit, as Ecology incorporated input from stakeholders to best achieve environmental protection while reducing compliance burden:

- Compliance schedules can be used to delay and spread out the costs of complying with the general permit.

- Facilities that only store fresh fruit (no drenching or packing) will not have to write the sections of the ECP that deal with their SPM or SWMM. Most of these facilities s are small businesses due to the lower labor requirement of fruit storage.
- Sedimentation devices are not required for discharges of noncontact cooling water to land application, percolation systems, and surface waters.
- The general permit's monitoring requirements have been reduced for some facilities.
- Permit fees for small businesses covered by the Fresh Fruit Packing General Permit are decreased in three ways:
    1. Facilities covered under the general permit receive a 30 percent discount on the standard fee.
    2. New general permit applicants who currently have individual permits are not required to pay application fees.
    3. Small businesses (as defined by the fee rule) can apply for fee reductions.

Chapter 1: Introduction to the Economic Impact Analysis

This Small Business Economic Impact Analysis (SBEIA) estimates the costs of complying with the Fresh Fruit Packing General Permit ("permit"). It compares the costs of complying with the permit for small businesses to the costs of compliance for the largest 10 percent of businesses, to determine whether the permit disproportionately impacts small businesses. This analysis is required by state rule in Washington Administrative Code (WAC) 173-226-120,[4] which directs Ecology to determine if the permit imposes disproportionate burden on small businesses, and if it does, to mitigate the disproportion to the extent that is legal and feasible.

1.1 Scope

WAC 173-226-120 requires the SBEIA to include:

- A brief description of the compliance requirements of the general permit.
- The estimated costs of complying with the permit, based on existing data for businesses intended to be covered under the general permit, including:
    - The minimum technology based treatment requirements identified as necessary under WAC 173-226-070.
    - The monitoring requirements contained in the general permit.
    - The reporting and recordkeeping requirements.
    - Plan submittal requirements.
    - Equipment.
    - Supplies.
    - Labor.
    - Increased administrative costs.
- A comparison, to the greatest extent possible, of the cost of compliance for small businesses with the cost of compliance for the largest 10 percent of businesses intended to be covered under the permit.
- A summary of how the permit provides mitigation to reduce the effect on small businesses (if a disproportionate impact is expected), without compromising the mandated intent of the permit.

1.2 Definitions of small and large businesses

For the purposes of the SBEIA, a small business is an independent entity with 50 or fewer employees. Government enterprises are excluded. Employment is typically based on the highest available level of ownership data.

[4] Chapter 173-226 WAC Waste Discharge General Permit Program
https://apps.leg.wa.gov/wac/default.aspx?cite=173-226

1.3 Permit Coverage

Every new or existing commercial fresh fruit packing facility in Washington that receives, packs, stores, or ships hard or soft fruit must get coverage under this general permit or under an individual permit. A general permit for fresh fruit packing facilities was first issued in 1994, along with an economic analysis of the general permit's impacts, and has been reissued about every five years since that date. Prior economic analyses of the various impacts of each permit reissuance have determined there have been no significant changes to the permit since the original issuance.

Ecology has, therefore, updated the inputs and values in the original analysis of this permit (Small Business Economic Impact Statement for the Fresh Fruit Packing General Permit, 1993) and the subsequent analysis from 2016 (Small Business Economic Impact Statement for the Fresh Fruit Packing General Permit, 2016).[5] Ecology believes this will maintain consistent methodology and assumptions across analyses, while updating to current industry characteristics and prices.

Fresh fruit packing facilities pack and store the following types of fruit:

- Apples
- Pears
- Sweet cherries
- Peaches
- Prunes
- Apricots
- Plums
- Berries

Washington's fresh fruit packing facilities primarily process apples, cherries and pears. Most facilities are located in the central region of the state along the Columbia, Okanogan, Wenatchee, and Yakima rivers. Currently, about 165 fresh fruit packing facilities – owned by 80 businesses – are covered under this permit.[6]

Firms that own and operate facilities within the fruit packing industry come from a variety of North American Industry Classification System (NAICS) codes.[7] The impacted NAICS codes are listed in Table 1.

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[5] Ecology Publication 16-10-014 https://apps.ecology.wa.gov/publications/SummaryPages/1610014.html

[6] 14 facilities have permits that are currently inactive. For purposes of this analyses, they are included in the analysis and treated like the facilities with active permits.

[7] NAICS codes are currently the standard used to define industries, and are used here in place of Standard Industry Classification (SIC) codes.

Table 1: Impacted Industries by NAICS

NAICS Code	Industry
111331	Apple Orchards
111339	Other Noncitrus Fruit Farming
111998	All Other Miscellaneous Farming
112112	Cattle Feedlots
115114	Postharvest Crop Activities (except Cotton Ginning)
424480	Fresh Fruit and Vegetable Merchant Wholesalers
424490	Other Grocery and Related Products Merchant Wholesalers
445230	Fruit and Vegetable Markets
488991	Packing and Crating
493110	General Warehousing and Storage
493120	Refrigerated Warehousing and Storage

Fruit packing has six basic waste streams including:

1. Drencher
2. Float tank
3. Flumes
4. Non-contact cooling water
5. Process lines (wash, rinse, pack) and cleanup
6. Stormwater

Fresh fruit packing facilities use anti-oxidants, fungicides, density enhancers, disinfectants, biocides, waxes, and cleaners that contain chemicals. These products contain the following chemicals:

- Calcium chloride
- Captan
- Chlorine
- Dichloran
- Difenoconazole
- Diphenylamine (DPA)
- Ethoxyquin
- Lignosulfonate
- Penbotec
- Potassium carbonate
- Potassium phosphate
- Scholar
- Sodium orthophenylphenate (SOPP)
- Sodium silicate
- Sodium sulfate
- Thiabendazole

Facilities may drench apples with antioxidants and fungicides. They may use float water that contains fungicides. Float waters for pears, apricots, peaches, and nectarines may also contain density enhancers.

They may use detergents to wash fruit, and they may use waxes that contain fungicides. Some packers use flumes to transport fruit, with disinfectants added to flume water. They may also add biocides to noncontact cooling water. Solid waste such as dirt, leaves, and twigs may also be present in fruit packer waste water (these are usually screened out of the waste water and disposed of as solid waste). Packers may also have stormwater discharges.

Under the general permit, fruit packing waste waters are discharged to six treatment and disposal methods (TDMs):

1. Lined evaporative lagoons
2. Dust abatement
3. Publicly owned treatment works (POTWs)
4. Land application
5. Percolation systems
6. Surface water

These treatment and disposal methods are described further below.

1.3.1 Lined evaporative lagoons

Lined evaporative lagoons are "impervious, engineered structures which rely on evaporation for water removal." They can also come in the form of above-ground tanks made of metal or fiberglass. In-ground evaporative lagoons are lined with an impervious geomembrane made of synthetic liner such as high-density polyethylene (HDPE).

This TDM is allowed for most regulated waste streams, except for pear packing using lignosulfonate (with or without SOPP) in float water. Lagoons and dust abatement are the only TDMs for which the use of Difenoconazole is allowed. The general permit places a set of best management practices (BMPs) and other requirements on lined evaporative lagoons.

Ecology has determined that a lagoon liner that meets or exceeds the performance specifications of a 60 mil thick HDPE liner (or a fiberglass, above-ground tank) is AKART for the waste waters the permit allows to be discharged to a lagoon. Such a lagoon or tank is also required to avoid violations of the state ground water quality standards.

1.3.2 Dust abatement

The fresh fruit packing industry uses waste water to suppress dust on unpaved lots used for storage bins and unpaved roads.

The general permit conditions place a set of BMPs and other requirements for dust abatement. These conditions are needed to avoid violations of the state surface and ground water quality standards.

This TDM is allowed for most regulated waste streams, except for the following three instances:

1. Pear packing using potassium phosphate (with or without chlorine or SOPP) in float water.
2. Noncontact cooling water with priority pollutants, dangerous wastes, or toxics in toxic amounts.

A facility must also write a Road Management Plan (RMP). A RMP describes the site-specific conditions for the application of all waste streams that principally contain lignosulfonate, sodium silicate, or DPA. A separate RMP is required for each dust abatement application site, and for each separate waste water type. Separate sites are required for products that may cause synergistic effects by co-mingling (wastewater containing: DPA, Lignosulfonate, Chlorine-based products, Natamycin, and Difenoconazole must each have separate discharge sites). They must also periodically review and update the RPM facility.

1.3.3 Publically owned treatment works (POTWs) and on-site sewage devices

Publically Owned Treatment Works (POTWs) are municipal or regional water treatment plants. A POTW must permit the facilities' wastewater discharge that will be treated at the POTW.

The general permit conditions place a set of BMPs and effluent limits on discharges to POTWs or on-site sewage devices. These conditions are needed to comply with state, local, and federal pretreatment rules.

This TDM is allowed for limited waste streams and chemicals, and is not allowed for discharges from drenchers and dip tanks.

1.3.4 Land application

Land application is an engineered system for applying waste water to a vegetated land surface. The waste water is treated by chemical, biological, and physical processes as it flows through the plant-soil matrix. The system involves a vegetated application site, a distributions system (sprinklers), and a lined lagoon or other Ecology-approved, self-contained storage system for storing waste water during periods when the facility cannot apply it to the land.

The general permit conditions place a set of BMPs and effluent limits on land application. Some of these conditions are needed to avoid violations of the state surface and ground water quality standards.

This TDM is allowed for most regulated waste streams, except for the following three instances:

1. Pear packing using lignosulfonate (with or without SOPP) in float water;
2. Noncontact cooling water with priority pollutants, dangerous wastes, or toxics in toxic amounts; and
3. Drencher and dip tanking or apple and cherry packing with Difenoconazole.

Separate sites are required for products that may cause synergistic effects by co-mingling (wastewater containing: DPA, Lignosulfonate, Chlorine-based products, and Natamycin must each have separate discharge sites).

1.3.5 Percolation systems

Percolation systems are engineered systems for the aerobic treatment of waste water as it flows through the soil matrix. These systems are designed to account for:

- Hydraulic and nutrient loading rates.
- Wet and dry cycles.
- Uniform waste water distribution.
- Other relevant parameters.

The general permit conditions place a set of BMPs and other requirements, as well as effluent limits on percolation systems.

This TDM is allowed for limited waste streams and chemicals, and is not allowed for noncontact waste water with priority pollutants, dangerous wastes, or toxics in toxic amounts.

1.3.6 Surface water

Discharges of waste water to lakes, rivers, ponds, streams, creeks, irrigation canals and return drains, wetlands, stormwater or other collection systems discharging to surface waters, and all other surface waters and watercourses are allowable under certain circumstances.

The general permit conditions place a set of BMPs and other requirements, as well as water-quality-based effluent limits, on discharges to surface waters.

This TDM is limited to a few types of discharge:

- Waste water from apple floats, flumes, and rinses containing no chemicals or only chlorine-based fungicides may be discharged to surface waters.
- Pear packing using a floatless dumper with only chlorine or no fungicides may also discharge to surface waters.
- Noncontact cooling water without priority pollutants, dangerous wastes, or toxics in toxic amounts.

Following secondary treatment, waste water from apple floats, flumes, and rinses that wash or wax products only, or containing chlorine-based fungicides, may be discharged to surface waters, as well.

1.4 Monitoring

The general permit conditions contain monitoring requirements and effluent limits. For discharges to POTWs, the strictest state or local effluent limit applies.

1.4.1 Effluent monitoring

Monitoring requirements and effluent limits are specific to the type of wastewater TDM the facility uses. All analyses except those for flow and temperature must be done by an accredited laboratory.

For each of the six TDMs, there are two types of monitoring:

1. Effluent monitoring
2. Additional monitoring

Noncontact cooling water that is discharged to lined evaporative lagoons or percolation systems, or is land applied must only be monitored for free residual chlorine and pH.

Effluent monitoring is tiered. During the first year of the permit's term, the monitoring frequency for all parameters except flow is quarterly. In the remaining years of the permit term, the facility may monitor on an annual basis if approved by Ecology, except for discharges to surface waters. Annual monitoring is allowed if, during the first year, both criteria below are met:

- No average pollutant concentration exceeds 90 percent of its effluent limit.
- No discharge prohibition or any other permit condition has been violated.

Additional monitoring consists of:

- Recording information on discharges and land application.
- Information on identity of persons that haul away sludge and waste water.
- Visual inspections for water quality problems.

For each of the six TDMs, facilities must:

- Take additional samples to characterize unusual discharges and conditions.
- Record results of all analyses in a facility logbook.

1.4.2 Stormwater monitoring

All facilities that discharge stormwater directly to surface waters or to a storm sewer system must apply for coverage under the Washington State Industrial Stormwater General Permit (ISGP).[8] Costs for stormwater management are therefore attributable to the ISGP and are not discussed in this analysis.

Stormwater, when it is combined with fruit packing process discharges (including non-contact cooling waters), is considered wastewater and remains covered under the General Permit for the Fresh Fruit Packing Industry; additional coverage under the Washington State Industrial Stormwater General Permit may not be required. Costs for management of stormwater in this capacity are included in this analysis.

1.5 Recordkeeping

The general permit conditions set specific requirements for recordkeeping and reporting for each permitted facility.

1.5.1 Records retention

Facilities must retain all records for at least five years from the date of any applications, sample, measurement, or plan. The following must be retained:

- Data used to complete the application for coverage under the general permit.
- The facility logbook.
- Strip chart recordings of any continuous monitoring.
- Copies of any submittal, report, plan, or application required by the general permit.
- Chain-of-custody documentation.

1.5.2 Facility logbook

Facilities must maintain a facility logbook. The facility logbook must contain the following records:

- Records of all chemicals and chemical product types used.
- Records of all discharge sampling and analytical work.
- Records of all maintenance and calibration of monitoring/sampling equipment.
- Records of inspection and maintenance for all TDMs.
- Batch mix records where applicable.

[8] For more information, please refer to: https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Industrial-stormwater-permit

1.5.3 Annual discharge monitoring report

The information in the facility logbook (described above) is used to produce the Annual Discharge Monitoring Report (ADMR). Facililties must compile the ADMR annually and retain it at the facility. The ADMR must contain:

- A description of all significant problems and any changes in facility management processes.
- Results of all required discharge monitoring.
- Copies of letters stating the facility has completed and is retaining all reports required by the permit (the original of the letter must be submitted to Ecology annually).
- Summary of information on treatment and disposal methods.

1.6 Environmental Compliance Plan

Each facility must develop an Environmental Compliance Plan (ECP). The ECP describes three facility management methods:

1. Treatment/Disposal Operations Method (TDOM).
   All facilities are required to write a TDOM, retain it on-site, and periodically review and update it.
2. Solid Waste Management Method (SWMM).
   Most facilities are required to write a SWMM, and periodically review and update the document. Facilities that only store fruit (no drenching or packing) do not have to write a SWMM.
3. Spill Prevention Method (SPM).
   Most facilities are required to write a SPM, and periodically review and update the document. Facilities that only store fruit (no drenching or packing) will not have to write a SPM.

For facilities that discharge stormwater, the Industrial Stormwater General Permit (ISGP) requires the ECP include a Stormwater Pollution Prevention Method (SWPPM).

1.7 Excluded costs

This SBEIA does not include the costs of complying with existing laws and rules, as permittees would be required to comply with requirements regardless of whether the permit reiterated or referenced them, or if the permit did not exist. Costs excluded from all SBEIAs include the costs of complying with:

- State ground water quality standards (WAC 173-200)
- State surface water quality standards (WAC 273-201A)
- State sediment management standards (WAC 173-204)
- Wastewater discharge permit fees (WAC 173-224)

- Federal laws and rules, including but not limited to the Clean Water Act and federal National Pollutant Discharge Elimination System (NPDES) regulations if discharging to surface waters.

1.8 Compliance costs included in the SBEIA

According to WAC 173-226-120, the SBEIA must estimate the costs of the following:

1. Minimum treatment technology
2. Monitoring
3. Reporting
4. Recordkeeping
5. Plan submittal
6. Equipment
7. Supplies
8. Labor
9. Administrative costs

As some costs are tied to one another, a more appropriate breakdown of compliance costs for this general permit (still including all of the required elements) follows:

1. Minimum state and federal technology-based treatment requirements. This includes treatment processes as well as source-control BMPs.
2. Monitoring requirements.
3. Reporting and recordkeeping requirements.
4. Plan requirements.

Each category of cost estimates must include the costs of equipment, supplies, labor, and increased administrative costs. They must include the cost of professional services necessary to comply with this general permit.

Chapter 2: Costs of Compliance with the General Permit

Costs to comply with the general permit are dependent on:

- The size of the fresh fruit packing facility, as measured by the number of bins processed.
- The number, type, and volume of waste streams generated by the facility.

Ecology expects these to vary significantly across fresh fruit packing facilities.

The amount of waste water a facility generates is dependent on the production practices they use and the number of bins they process. Production practices can vary significantly across facilities. Two facilities producing the same number of bins may use different production practices and, thus, generate different volumes of waste water.

In this chapter, Ecology estimated ranges of costs. For each requirement of the general permit, Ecology estimated a low cost and a high cost. The low cost estimate is for small facilities, and the high cost estimate is for large facilities, as measured by the median number of bins processed by facilities with under 50 employees, versus facilities with over 50 employees. The cost estimates do not take into account every characteristic and condition that can cause compliance costs to vary. Ecology expects estimates to be accurate for the typical facility.

Most of the major assumptions used in making the compliance cost estimates are presented in this chapter. In particular, assumptions used in making estimates of capital costs are included. Ecology annualized capital costs to compare them to the value of fruit processed annually by fresh fruit packing facilities.

It is necessary to annualize costs because some costs are annual (incurred every year), while other costs are capital costs (incurred once). For example, the construction of a lagoon is a one-time capital cost, while recordkeeping is an annual cost facilities incur every year. And, because the useful life of capital goods can vary, Ecology annualizes capital costs to make the costs of different goods comparable. Capital costs are annualized using a 2.81 percent real discount rate (accounting for expected inflation), and varying assumptions about the useful life span for capital goods.[9]

Ecology estimated labor costs using two wage rates.

[9] To calculate the real discount (interest) rate, Ecology used the estimated industry return on invested capital (5%; as used in apple and pear producing and packing economic analyses by the Washington State University Extension Program), and subtracted expected inflation as based on semi-annual rates reported by the US Treasury between April 1998 and April 2021.

1. For manual labor, including task such as removing sludge or taking samples, Ecology used $19.41 per hour, which is the Bureau of Labor Statistics median hourly wage for material moving occupations.[10]
2. For managerial work, such as writing a compliance plan, Ecology used the average hourly wage of $45.71, which is the Bureau of Labor Statistics median hourly wage for engineering and architecture occupations.[11]

Costs fall under the following categories:

- Process waste water treatment and disposal methods.
- Monitoring
- Recordkeeping
- Plan requirements

2.1 Cost Scenarios

The required BMPs and effluent limits may cause some facilities to switch TDMs, or to change the way they conduct the TDMs they are presently using. Ecology expects most packers are already in compliance with most, or all, of the requirements in this general permit. Ecology does not believe most packers will have to change their behavior. While overall compliance costs and costs for new fresh fruit packing facilities are estimated in this document, Ecology does not expect additional costs to actually be incurred by the majority of existing facilities.

For the purposes of cost estimation, Ecology assumes no facility will switch from their current TDMs for process waste water to discharging to surface waters, POTWs, or percolation systems. Ecology does not expect facilities to switch to these four TDMs because they are more costly than the remaining two methods – dust abatement and land application. The more costly lined evaporative lagoon may be necessary, however, for facilities using more highly regulated chemicals that have strict limitations on land application and dust abatement. As a conservative cost measure, Ecology estimated this scenario, as well.

Tables 2 – 4 (below) list the characteristics of five TDM scenarios. Ecology estimated TDM compliance costs for these five scenarios. The scenarios describe common situations in the fresh fruit packing industry, and account for facilities who use newer process chemicals in the industry that have been added to the reissued general permit. Process waste water is commonly discharged to POTWs and land applied. However, many facilities have noncontact cooling water, which they typically discharge to percolation ponds or ditches. Making other assumptions about compliance cost scenarios is not expected to alter the conclusions of this analysis.

[10] United States Bureau of Labor Statistics, May 2020. "May 2020 State Occupational Employment and Wage Estimates" for Washington State. Wages do not include overhead, as the tasks are assumed to be conducted by existing staff.
[11] *Ibid.*

Table 2: Scenario One

Waste stream	TDM
Process Waste Water	Land Application
DPA Drencher	Land Application / Dust Abatement
Lignosulfonate / Sodium Silicate	Dust Abatement
Noncontact Cooling Water	Percolation

Table 3: Scenario Two

Waste stream	TDM
Process Waste Water	POTW
DPA Drencher	Land Application / Dust Abatement
Lignosulfonate / Sodium Silicate	Dust Abatement
Noncontact Cooling Water	Percolation

Table 4: Scenario Three

Waste stream	TDM
Process Waste Water	Percolation
DPA Drencher	Land Application / Dust Abatement
Lignosulfonate / Sodium Silicate	Dust Abatement
Noncontact Cooling Water	Percolation

Under all three scenarios, DPA drencher waste water may or may not be recycled.

For Scenarios One, Two, and Three, Ecology estimated total compliance costs for the following two sub-scenarios:

1. The facility uses lignosulfonate, potassium carbonate, or sodium silicate to float pears (Sub-Scenario A)
2. The facility does not use lignosulfonate, potassium carbonate, or sodium silicate to float pears (Sub-Scenario B)

Total compliance costs under Sub-Scenario A are for facilities that pack pears and use float water. Total compliance costs under Sub-Scenario B are for facilities that do not pack pears and, thus, do not use float water.

For Scenario Four, Ecology estimated a scenario in which the facility uses process chemicals that are added in the 2009, 2016, and current general permits, including Captan, Dichloran, Penbotec, Scholar, and Difenoconazole.

Table 5: Scenario Four

Waste stream	TDM
Process Waste Water	Land Application
DPA Drencher	Land Application / Dust Abatement
Captan / Dichloran / Penbotec / Scholar	Lined Evaporative Lagoon
Difenoconazole	Lined Evaporative Lagoon / Dust Abatement
Noncontact Cooling Water	Percolation

For Scenario Five, Ecology assumed the facility does not pack or drench, and only stores fruit. Noncontact cooling water that contains no priority pollutants or toxics in toxic amounts may be discharged to a percolation pond. Noncontact cooling water with such pollutants must be discharged to an evaporative pond.

Table 6: Scenario Five

Waste stream	TDM
Noncontact Cooling Water	Percolation

2.2 Process waste water treatment and disposal methods

Fresh fruit packing facilities can use six TDMs for their wastewater discharges:

1. Lined evaporative lagoon
2. Dust abatement application
3. POTWs or on-site sewage device
4. Land application
5. Percolation systems
6. Surface waters

The general permit contains the required BMPs and effluent limits for each of the six TDMs. The required BMPs and effluent limits may cause some facilities to switch TDMs, change the practices they use in performing a TDM, or change production processes.

Some portion of the costs of collecting, storing, and disposing of waste water must be incurred regardless of the general permit's requirements to dispose of the waste water. Therefore, a portion of these costs are not part of the costs of complying with the permit. They are costs of production rather than costs of compliance. In particular, most costs of collecting and conveying waste waters are not treated as compliance costs. Waste waters must be disposed of somehow, regardless of the general permit.

2.2.1 Costs: lined evaporative lagoon

Nearly all fresh fruit packing facilities can discharge their waste streams to evaporative lagoons. However, Lignosulfonate (with or without SOPP) in float waste water may not be discharged to

evaporative lagoons. Lagoons and dust abatement are the only TDMs for which Difenoconazole is allowed.

Lined evaporative lagoon cost estimates are made under two assumptions:

1. The facility recycles DPA: It discharges drencher waste water to a low-volume evaporative lagoon (or above-ground fiberglass tank).

   Ecology estimated costs based on assumed lagoon volumes: a 2,000-gallon lagoon for small businesses and a 24,000-gallon lagoon for large businesses.

2. The facility does not recycle DPA: It discharges DPA drencher waste water to a high-volume evaporative lagoon. Some facilities may also need high-volume, lined storage lagoons for waste streams that are land-applied or used for dust abatement.

   Ecology estimated costs based on assumed lagoon volumes: a 100,000-gallon lagoon for small businesses and a 300,000-gallon lagoon for large businesses.

Components of the cost of a lined evaporative lagoon are:

1. Lagoon construction
2. Land
3. Sludge disposal
4. Fencing
5. Operations and maintenance labor

Lagoon Construction

Ecology assumes the cost for construction will vary by lagoon size. We estimated construction costs based upon past values used to analyze the impacts of this general permit. Ecology updated these values for inflation, and for the lagoons to be lined using 60-mil thick HDPE liner. We also compared these estimates to real cost values provided by the fresh fruit packing industry; estimates were consistent with real-world costs.

Ecology used the following assumptions in making cost estimates:[12,13]

- Low-volume lagoons (2,000 and 24,000 gallons) will cost between $0.72 and $1.06 per gallon to construct.
- High-volume lagoons (100,000 and 300,000 gallons) will cost between $0.11 and $0.31 per gallon to construct.

[12] Solid Waste Financial Assistance Program, for the Oklahoma Department of Environmental Quality, 2000. Survey of eight sources of 40-mil and 60-mil thickness HDPE geomembrane liner. US Bureau of Labor Statistics, Consumer Price Index for 2009 and 2021.

[13] Values are likely to be conservatively high, as Ecology as assumed an increase in all lagoon-construction costs that is proportional to the expected increase in HDPE liner costs.

- All lagoons have a usable lifetime of 20 years.

Tables 7 and 8 (below) show the calculations made in estimating the cost of constructing each type of lagoon. Costs are annualized over 20 years, using a 2.81 percent interest rate.

Table 7: Cost Estimate – Evaporative Lined Lagoon (Low Volume)

Business Size	Gallons	Capital Cost Low Estimate	Capital Cost High Estimate	Annualized Cost Low Estimate	Annualized Cost High Estimate
Small	2,000	$ 1,450	$ 2,133	$ 96	$ 141
Large	24,000	$ 17,399	$ 25,598	$ 1,149	$ 1,690

Table 8: Cost Estimate – Evaporative Lined Lagoon (High Volume)

Business Size	Gallons	Capital Cost Low Estimate	Capital Cost High Estimate	Annualized Cost Low Estimate	Annualized Cost High Estimate
Small	100,000	$ 11,260	$ 31,377	$ 744	$ 2,072
Large	300,000	$ 33,781	$ 94,131	$ 2,231	$ 6,216

Land

Ecology assumed that land for building the lagoon costs between $1,012 and $2,644 per acre, based on US Department of Agriculture data. This range includes the per-acre value of cropland, pasture, and farm real estate overall.

Ecology assumed the land required for the low volume lagoons is less than 0.1 acres and the facility already has enough land for hosting the lagoon. Therefore, construction of a low-volume lagoon would not require purchasing or renting additional land.

Ecology assumed the 100,000-gallon lagoon requires 0.5 acres, while the 300,000 and 600,000-gallon lagoons require one acre. The land cost is annualized over seventy years using a 2.81 percent interest rate.

Table 9: Cost Estimate-- Land for Lagoon

Size	Capital Cost Low Estimate	Capital Cost High Estimate	Annualized Cost Low Estimate	Annualized Cost High Estimate
2,000 gallons	$ 0	$ 0	$ 0	$ 0
24,000 gallons	$ 0	$ 0	$ 0	$ 0
100,000 gallons	$ 506	$ 1,322	$ 17	$ 43
300,000 gallons	$ 1,012	$ 2,644	$ 33	$ 87

Sludge Disposal

The lagoon will generate sludge. Under normal conditions, Ecology expects facilities to designate the sludge as a solid waste, rather than a hazardous waste. Thus, sludge can and would be land-applied.

Assuming a facility recycles DPA (meaning the facility has a low-volume lagoon), Ecology estimated that removing sludge from a small lagoon (2,000 gallons) will take two hours per year, and cost $39 per year at a wage rate of $19.41 per hour. Removing sludge from a large lagoon (24,000 gallons) will take eight hours per year, and cost $155 per year.

Assuming a facility does not recycle DPA and the facility has a high-volume lagoon, Ecology estimated that removing sludge from a small lagoon (100,000 gallons) will require 8 hour of work every five years; an annualized cost of $34 at a wage rate of $19.41. Removing sludge from a large lagoon (300,000 gallons) will require 16 hours of work every five years; an annualized cost of $67 per year.

Fencing

Facilities must enclose the lagoon with a fence. Ecology assumed that a fence is a six-foot high, chain link fence. Table 10 contains the cost estimates:

Table 10: Cost Estimate – Fence[14]

Gallons	Fence Length (feet)	Price per Foot	Capital Cost	Annualized Cost
2,000	48	$41.38	$1,986	$231
24,000	120	$29.01	$3,481	$404
100,000	480	$24.04	$11,539	$1,340
300,000	720	$23.32	$16,789	$1,949

Costs are annualized over ten years using a 2.81 percent discount rate.

Operations and Maintenance Labor

Facilities must pump drencher waste water into a tank, and then take it to the lagoon. This work only occurs during the time of the year when the drencher is being used.

Assuming a facility recycles DPA (with a low-volume lagoon), Ecology estimated that this work requires two hours per day for two days each year. At a wage rate of $19.41 per hour, this work costs $155 per year.

Assuming a facility does not recycle DPA (with a high-volume lagoon), Ecology estimated that this work requires two hours per day for 60 days per year. At a wage rate of $19.41 per hour, this work costs $2,329 per year.

Total Cost: Lined Evaporative Lagoon

Tables 11 and 12 (below) show the annualized costs of constructing and using a lined evaporative lagoon under the general permit, with and without DPA recycling:

[14] US Bureau of Labor Statistics, Consumer Price Index for 2008 and 2021

Table 11: Total Cost Estimate – Evaporative Lined Lagoon (Low Volume, DPA Recycling)

Requirement	Small Business (2,000 gallon)	Large Businesses (24,000 gallon)
Construction	$ 96 - 141	$ 1,149 – 1,690
Fence	$ 231	$ 231
Land	$ 0	$ 0
Sludge Disposal	$ 39	$ 155
O & M -- Labor	$ 155	$ 155
TOTAL	**$ 521 - 566**	**$ 1,690 - 2,131**

Table 12: Total Cost Estimate – Evaporative Lined Lagoon (High Volume, No DPA Recycling)

Cost Element	Small Business (100,000 gallon)	Large Business (300,000 gallon)
Construction	$ 744 – $2,072	$2,231 – $6,216
Fence	$ 1,340	$ 1,949
Land	$ 17 - $ 43	$ 33 - 87
Sludge Disposal	$ 34	$ 67
O & M -- Labor	$ 2,329	$ 2,329
TOTAL	**$ 4,463 – 5,818**	**$ 6,610 – 10,649**

2.2.2 Costs: dust abatement application

Under the general permit, dust abatement is an available TDM for most processes and chemicals. It is the only TDM available for lignosulfonate (with or without SOPP) in float water. For the purposes of the SBEIA, Ecology assumed all fresh fruit packing facilities who use lignosulfonate and similar chemicals will dispose of waste water through dust abatement. Some facilities may switch to a different chemical, but maintain the same process.

Components of the cost of dust abatement are:

1. Road Management Plan
2. Application BMPs (labor)
3. Land
4. Lined storage lagoon

Road Management Plan

Facilities must write a Road Management Plan (RMP) for each separate dust abatement application site, and for each separate waste water type. Ecology assumed each facility that used these waste waters for dust abatement must write one RMP. Table 13 shows the calculations made in estimating the cost of writing the RMP. Ecology assumed the wage rate for this level of work was $45.71 per hour. Costs are annualized over the five-year term of the permit using a 2.81 percent discount rate.

Table 13: Cost Estimate – Road Management Plan

Size	Hours	Cost	Annualized Cost
Small	8	$366	$79
Large	16	$731	$159

Application Best Management Practices – Labor

Applying waste water to roads in accordance with the BMPs specified in the general permit requires additional labor. Ecology assumed the wage rate was $19.41 per hour.

For a facility who applies only lignosulfonate or similar chemicals, Ecology estimated two hours per week, for ten weeks. The annual labor cost is $388.

For the application of Penbotec or Scholar fungicides, Ecology estimated two hours per application, for the median 15 applications per year. The annual labor cost is $582.

If the facility recycles drencher waste water, only when applying DPA, the amount of labor required is four hours, every 60-days, each year. The annual labor cost is $465.

If the facility does not recycle DPA drencher waste water, only when applying DPA, the amount of labor required is two hours per day, every 60-days, each year. The annual labor cost is $2,329.

Land

Ecology assumed access to roads and parking lots for dust abatement application is free on site. Therefore, the cost of buying or leasing land for dust abatement application is zero.

Lined Storage Lagoon

Some facilities may have to build high-volume storage lagoons to store waste water during periods when dust abatement application is not allowed. Storage lagoon costs are estimated in the section above. Table 14 summarizes the cost of a high-volume lined storage lagoon:

Table 14: Cost Estimate – Lined Storage Lagoon

Cost Element	100,000 gallon	300,000 gallon
Construction	$ 744 – $2,072	$2,231 – $6,216
Fence	$ 1,340	$ 1,949
Land	$ 17 - $ 43	$ 33 - 87
Sludge Disposal	$ 34	$ 67
O & M -- Labor	$ 2,329	$ 2,329
TOTAL	**$ 4,463 – 5,818**	**$ 6,610 – 10,649**

Total Costs

For the purposes of the SBEIA, Ecology assumed there are five possible waste streams fresh fruit packing facilities can use for dust abatement application:

1. Lignosulfonate and similar chemicals.

2. Penbotec or Scholar.
3. Dinfenoconazole.
4. DPA drencher with recycling of DPA.
5. DPA drencher with no recycling of DPA.

Tables 15 – 19 (below) summarize the annualized costs of dust abatement application under the general permit:

Table 15: Total Cost Estimate – Dust Abatement (Lignosulfonate)

Requirement	Small	Large
Road Management Plan	$ 79	$ 159
Application BMPs -- Labor	$ 388	$ 388
TOTAL	**$ 468**	**$ 547**

Table 16: Total Cost Estimate – Dust Abatement (Penbotec or Scholar)

Requirement	Small	Large
Road Management Plan	$ 79	$ 159
Application BMPs -- Labor	$ 582	$ 582
TOTAL	**$ 662**	**$ 741**

Table 17: Total Cost Estimate – Dinfenoconazole

Requirement	Small	Large
Road Management Plan	$ 79	$ 159
Application BMPs -- Labor	$ 1,165	$ 1,165
TOTAL	**$ 1,244**	**$ 1,323**

Table 18: Total Cost Estimate – Dust Abatement (DPA Recycling)

Requirement	Small	Large
Road Management Plan	$ 79	$ 159
Application BMPs -- Labor	$ 466	$ 466
TOTAL	**$ 545**	**$ 625**

Table 19: Total Cost Estimate – Dust Abatement (No DPA Recycling)

Requirement	Small	Large
Road Management Plan	$ 79	$ 159
Application BMPs -- Labor	$ 2,329	$ 2,329
TOTAL	**$ 2,409**	**$ 2,488**

2.2.3 Publicly-owned treatment works (POTWs) and on-site sewage

A limited number of waste streams and chemicals can be discharged to POTWs. The following cannot be discharged to POTWs:

- Drencher or dip tank waste waters;
- Captan
- Dichloran
- Penbotec
- Scholar
- Difenoconazole
- Lignosulfonate in floats
- Potassium phosphate
- Sodium sulfate
- Sodium silicate in floats
- Noncontact cooling water containing priority pollutants
- Toxics at significant levels

Facilities should already be complying with the limits placed on POTW discharges set by the POTWs, and by state and federal rules. No additional treatment is necessary to comply with these rules for most chemicals. For waste water containing sulfate chemicals, pretreatment may be necessary to meet sulfate limits, but Ecology assumed other chemicals would be substituted if pretreatment costs exceeded costs associated with discharge of other chemicals. The cost of compliance with these conditions is, therefore, zero.

In addition, because of restrictions imposed by both Ecology and POTWs, few fresh fruit packing facilities are likely to switch from another TDM to discharging to POTWs. Making such a change may be too costly, or impossible, since infrastructure, geography, and local rules also limit waste water access to POTWs.

2.2.4 Land application

Most fresh fruit packing facility waste streams can be land-applied. However, the waste streams that cannot be land-applied are:

- Float waste water containing lignosulfonate (with or without SOPP).
- Noncontact cooling water containing priority pollutants or toxics in toxic amounts.
- Any wastewater containing Difenoconazole.

Land application is a common method of disposing of process waste water and DPA drencher waste water. Some noncontact cooling water is land-applied, as well.

Components of the cost of land application are:

1. Sedimentation device

2. Application BMPs (labor)
3. Application BMPs (equipment)
4. Land cost
5. Lined storage lagoon

Sedimentation Device

Table 20 shows the calculations made in estimating the cost of a sedimentation device. Costs are annualized over ten years, using a 2.81 percent interest rate.

Table 20: Cost Estimate – Sedimentation Device[15]

Size	Capital Cost	Annualized Cost
Low	$930	$108
High	$3,720	$432

Sedimentation devices are not required for noncontact cooling water waste streams.

Application Best Management Practices – Labor

Applying waste water in accordance with the BMPs required under the general permit requires additional labor costs. Ecology assumed a wage rate of $19.41 per hour. For large facilities, Ecology assumed the amount of labor required is two hours per day throughout the year. The annual labor cost is then $14,169. For small facilities, Ecology assumed the amount of labor required is one hour per day throughout the year. The annual labor cost is $7,085.

Application Best Management Practices – Equipment

Applying waste water in accordance with the BMPs required under the general permit requires additional labor costs. The equipment consists of piping and a sprinkler system. Whether facilities must purchase equipment, or upgrade it, the cost is necessary to comply with the permit if waste streams are land-applied. Sprinkler irrigation is the most appropriate use for facility waste waters. Using data from the fresh fruit packing industry, Ecology estimated that a sprinkler system costs an average of $3,000 per acre irrigated. Table 21 (below) shows the calculations made in estimating this cost. Costs are annualized over ten years, using a 2.81 percent interest rate.

Table 21: Cost Estimate – Application BMPs (Equipment)[16]

Size	Number of Acres to Irrigate	Total Cost	Annualized Costs
Small	1	$ 3,000	$ 348
Large	20	$ 60,000	$ 6,996

[15] US Bureau of Labor Statistics, Consumer Price Index for 2009 and 2021.
[16] US Bureau of Labor Statistics, Consumer Price Index for 2009 and 2021.

Land Cost

Ecology assumed access land for land application is free on site. Therefore, the cost of buying or leasing land for land application is zero.

Lined Storage Lagoon

Some facilities may have to build lined storage lagoons to store waste water during periods when land application is not allowed. High-volume storage lagoon construction costs are estimated in the Section 2.2.1. Table 22 (below) summarizes the cost of a high-volume lined storage lagoon:

Table 22: Cost Estimate – Lined Storage Lagoon

Cost Element	100,000 gallon	300,000 gallon
Construction	$ 647 - 1,804	$ 1,942 – 5,411
Fence	$ 1,166	$ 1,697
Land	$ 14 - 38	$ 29 - 76
Sludge Disposal	$ 28	$ 56
O & M -- Labor	$ 1,932	$ 1,932
TOTAL	**$ 3,788 - 4,968**	**$ 5,655 - 9,171**

Total Costs

Table 23 shows the annualized cost of land application according to the conditions of the general permit:

Table 23: Total Cost Estimate – Land Application

Requirement	Small	Large
Sedimentation Device	$ 108 - 432	$ 108 - 432
Application BMPs -- Labor	$ 7,085	$ 14,169
Application BMPs -- Equipment	$ 0 - 348	$ 0 – 6,966
TOTAL	**$7,193 – 7,865**	**$ 14,277 – 21,567**

Sedimentation devices are not required for noncontact cooling water waste streams that are land-applied.

2.2.5 Percolation systems

A limited number of waste streams and chemicals may be discharged to percolation systems under the general permit. Primarily, noncontact cooling water is discharged to percolation systems. For the purposes of the SBEIA, Ecology assumed most noncontact cooling water is currently discharged to percolation systems and will continue to be discharged in this fashion.

Components of the cost of percolation systems include:

1. Sedimentation device
2. Ground water monitoring
3. Effluent limits

Sedimentation Device

The cost of a sedimentation device is estimated in Section 2.2.4. Sedimentation devices are not required for noncontact cooling water.

Ground Water Monitoring

If ground water contamination occurs or is suspected to have occurred, or if some chemicals are applied at the maximum allowable rate, then the facility must install ground water monitoring wells. Table 24 (below) shows the estimated costs of ground water monitoring. Costs are annualized over the five years of the permit term, using a 2.81 percent interest rate.

Table 24: Cost Estimate – Ground Water Monitoring[17]

Amount of Contamination	Capital Cost	Annualized Cost
None	$ 0	$ 0
Low	$1,860	$404
High	$9,299	$2,020

Effluent Limits

Ecology does not expect facilities will have to install additional treatment to comply with effluent limits to percolation systems. The only impact of effluent limits will be that facilities will have to be more efficient in their chemical use, and may have to change the chemicals they use.

Some additional labor may be required to use the percolation system in accordance with BMPs. Ecology assumed the labor would entail one hour per week, throughout the year. Ecology assumed a wage rate of $19.41 per hour. Based on these assumptions, the annual labor cost is $1,009.

Total Costs

Tables 25 and 26 (below) show the annualized cost of discharging to percolation systems in accordance with the conditions of the general permit. There is no difference in costs between small and large businesses.

Table 25: Total Cost Estimate – Percolation System (All Waste Streams except Noncontact Cooling Water)

Requirement	Cost estimate
Sedimentation Device	$ 108 - 432
Ground Water Monitoring	$ 0 – 2,020
Effluent Limits	$ 1,009
TOTAL	**$ 1,017 – 3,461**

[17] US Bureau of Labor Statistics, Consumer Price Index for 2009 and 2021.

Table 26: Total Cost Estimate – Percolation System (Noncontact Cooling Water)

Requirement	Cost estimate
Ground Water Monitoring	$ 0 – 2,020
Effluent Limits	$ 1,009
TOTAL	**$ 1,009 – 3,029**

2.2.6 Surface waters

Under the general permit, the only waste waters that can be discharged to surface waters are:

- From apple or stone fruit floats, flumes, or rinses containing no chemicals, washing/waxing products (conditionally) or chlorine-based fungicides.
- From floatless dumpers with chlorine or no fungicides.
- Noncontact cooling water containing no priority pollutants or toxics in toxic amounts.

Components of the cost of surface water discharge include:

1. Sedimentation device
2. Flow meter
3. Water quality standards

Sedimentation Device

The cost of a sedimentation device is estimated in Section 2.2.4. Sedimentation devices are not required for noncontact cooling water.

Flow Metering and Heat Monitoring

When discharging to surface waters, flow metering is required. The annual capital costs of such metering is $58.[18] Discharging into the Columbia river also requires heat monitoring.

Water Quality Standards

The general permit requires compliance with the Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC). This condition is required to prevent violations of the state surface water quality standards. According to the general permit rule, costs to comply with the water quality standards are not to be included in the cost estimate.

Total Costs

Table 27 (below) shows the annualized cost of discharging to surface water in accordance with the conditions of the general permit. There is no difference in costs between small and large businesses.

[18] A 4" flow meter is assumed to cost $500 annualized over 10 years at a 2.81% discount rate.

Table 27: Total Cost Estimate – Surface Water

Requirement	Cost estimate
Sedimentation Device	$ 108 - 432
Flow monitor	$ 58
TOTAL	$ 166 - 490

Because sedimentation devices are not required for noncontact cooling water waste streams, the cost to comply for discharges of such waste streams to surface water is zero.

2.3 Monitoring costs

Monitoring requirements are specific to the type of waste water treatment and disposal methods used by the facility. For each of the six methods, the following cost estimates must be made:

1. Effluent monitoring
2. Additional monitoring
3. Monitoring of bypasses, upsets, etc.

2.3.1 Effluent monitoring

This general permit requires that all covered facilities discharging process water monitor and report on their effluent through an Annual Discharge Monitoring Report. To comply, most businesses contract with a laboratory to test and monitor their effluent, then submit the report themselves. Therefore, businesses face two types of costs:

1. Contracting with the laboratory for sampling and testing.
2. Submitting the Annual Discharge Monitoring Report.

Facilities are required to monitor effluent quarterly during their first year of the general permit, and then may reduce the frequency in subsequent years if approved by Ecology. For purposes of this analysis, Ecology assumes a business will sample quarterly during the first year, then twice a year for the following four years.

Tables 28 - 30 show the cost estimates for each type of effluent monitoring for each TDM. The cost is the same for small and large businesses.

Table 28: Cost Estimate – Laboratory Costs for Effluent Monitoring – Not Including Noncontact Cooling Water

Method	Cost per Sample	Annualized Cost
Lined evaporative lagoon	n/a	n/a
Dust abatement (drenching)	$ 599	$ 1,561
POTW	$ 187	$ 487
Land application	$ 218	$ 568
Percolation system	$ 218	$ 568
Surface water	$ 156	$ 407

Table 29: Cost Estimate – Reporting Costs for Effluent Monitoring – Including Noncontact Cooling Water

Method	Cost per Sample	Annualized Cost
POTW	$ 43	$ 111
Land application	$ 74	$ 192
Percolation system	$ 74	$ 192

Table 30: Cost Estimate – Reporting Costs for Effluent Monitoring

Method	Hours	Frequency	Annualized Cost
Lined evaporative lagoon	0.5	Quarterly	$ 91
Dust abatement	1	Once per Season	$ 183
POTW	1	Quarterly	$ 183
Land application	1	Once per Season	$ 183
Percolation system	1	Quarterly	$ 183
Surface water	1	Monthly	$ 549
Surface water	1	Quarterly	$ 183

Note that if a facility uses several TDMs (this is the typical case), then it will incur the costs of monitoring for all of the methods it uses.

2.3.2 Additional monitoring

Additional monitoring includes:

1. Information on discharges and land application of waste water.
2. Information on the identity of persons that haul away sludge and waste water.
3. Visual inspections for water quality problems.
4. Batch mix records for facilities that drench or float pears.
5. Lagoon liner inspections.

The cost of measuring effluent flow is included in this additional monitoring, rather than in the effluent monitoring above. Ecology assumed a wage rate of $19.41 per hour for this labor. Table 31 shows the cost estimates:

Table 31: Total Cost Estimate – Additional Monitoring

Method	Hours	Frequency	Duration	Annual Cost
Lined Evaporative Lagoon In Season	0.5 hrs	1 / day	60 days	**$582**
Lined Evaporative Lagoon Out of Season	0.5 hrs	1 / month	10 months	**$97**
Dust Abatement	0.5 hrs	1 / week	10 weeks	**$97**
POTW	0.5 hrs	1 / week	52 weeks	**$505**
Land Application	0.5 hrs	1 / day	240 days	**$2,329**
Percolation System	0.5 hrs	1 / week	52 weeks	**$505**
Surface Water	0.5 hrs	1 / week	52 weeks	**$505**

2.3.3 Monitoring of bypassed, upsets, etc.

Additional samples must be taken to characterize unusual discharges and conditions, including:

- Bypasses.
- Treatment process upsets.
- Maintenance problems that affect effluent quality.

Ecology did not estimate this cost, because no information exists on possible monitoring frequencies and pollutants in cases of error or upset that could place facilities out of compliance with other sections of the general permit.

2.4 Recordkeeping costs

Components of the cost of recordkeeping include:

1. Records retention
2. Facility logbook

2.4.1 Records retention

The facility must retain all records for at least five years from the date of any application, sample, measurement, or plan. The cost of complying with this permit condition is the cost of storing records. This cost is likely very low or close to zero.

2.4.2 Facility logbook

The facility must maintain a facility logbook. All the costs of complying with this requirement are labor costs. In making the cost estimates, Ecology assumed a wage rate of $19.41 per hour. Table 32 shows the cost estimates:

Table 32: Total Cost Estimate – Facility Logbook

Size	Hours / Year	Annualized Cost
Small	18	$349
Large	50	$971

2.5 Plan Requirements

2.5.1 Treatment/disposal operations method costs

All facilities must write an Environmental Compliance Plan (ECP), one part of the plan is for the Treatment/Disposal Operations Method (TDOM). All of the costs of complying with this requirement are labor costs. In making the cost estimates, Ecology assumed a wage rate of $45.71 per hour. This cost is incurred once per permit term. Tables 33 and 34 show the cost estimates. The cost of the TDOM is annualized over the five-year term of the permit, using an interest rate of 2.81 percent.

Table 33: Total Cost Estimate – Treatment/Disposal Operations Method Small Businesses

TDM	Hours	Total Cost	Annualized Cost
Lined Evaporative Lagoon	4	$183	$40
Dust Abatement	8	$366	$79
POTW	8	$366	$79
Land Application	8	$366	$79
Percolation System	8	$366	$79
Surface Water	8	$366	$79

Table 34: Total Cost Estimate – Treatment/Disposal Operations Method Large Businesses

TDM	Hours	Total Cost	Annualized Cost
Lined Evaporative Lagoon	8	$366	$79
Dust Abatement	16	$731	$159
POTW	16	$731	$159
Land Application	16	$731	$159
Percolation System	16	$731	$159
Surface Water	16	$731	$159

2.5.2 Solid waste management system costs

As part of the ECP, most facilities must write and retain a Solid Waste Management Method (SWMM). The SWMM is good for the life of the permit (5 years). Facilities that only store fresh fruit (no drenching or packing) will not have to write a SWMM. All of the costs of complying with this requirement are labor costs. In making cost estimates, Ecology assumed a wage rate of $45.71 per hour. Table 35 shows the cost estimates. The cost of the SWMM is annualized over the five-year term of the permit, using an interest rate of 2.81 percent.

Table 35: Total Cost Estimate – Solid Waste Management Method

Size	Hours	Cost	Annualized Cost
Small	4	$183	$40
Large	8	$366	$79

2.5.3 Spill prevention method costs

As part of the ECP, most facilities must write and retain a Spill Prevention Method (SPM). Facilities that only store fresh fruit (no drenching or packing) will not have to write a SPM. All of the costs of complying with this requirement are labor costs. In making cost estimates, Ecology assumed a wage rate of $45.71. Table 36 (below) shows the cost estimates. The cost of the SPM is annualized over the five-year term of the permit, using an interest rate of 2.81 percent.

Table 36: Total Cost Estimate – Spill Prevention Method

Size	Hours	Total Cost	Annualized Cost
Small	8	$366	$79
Large	16	$731	$159

2.5.4 Operation and Maintenance (O&M) manuals

For facilities that have installed wastewater treatment units, they must submit an Operations and Maintenance manual to Ecology. These manuals include the actual operation and maintenance procedures for each piece of equipment used for the treating of wastewater produced in the fruit packing and storage processes. They also include standard operating procedures for working equipment, cleaning, and preventing chemicals and fungicides spills. Spill prevention activities are dependent upon the spill potential that could affect or contaminate waters of the state.

The scope of an O & M manual depends on the amount of equipment, the amount and variability of chemicals, and the amount and variability of fruit processes at the facility. A time range is 40-80 hours, and $10,000 to $50,000 dollars to develop a comprehensive and complete manual.[19] Annualized over the five year term of the permit, using an interest rate of 2.81 percent yields annual costs of $2,172 to $10,859.

2.6 Total compliance costs

This section presents the total costs of compliance under each of the five cost scenarios. The five tables in this section present the total annual costs of compliance for small and large fresh fruit packing facilities under the five scenarios.

[19] Personal correspondence with Dean Smith, PE, HLA Engineering and Land Surveying, Inc. June 3, 2021.

Table 37: Scenario One Total Costs

Requirement	Small	Large
TREATMENT / DISPOSAL METHODS		
Land Application	$ 7,193 – 7,865	$ 14,277 – 21,567
Land Application / Dust Abatement (DPA)	$ 545 – 2,409	$ 625 – 2,488
Dust Abatement (Lignosulfonate)	$ 468	$ 547
Percolation System (Noncontact Cooling Water)	$ 1,009 – 3,029	$ 1,009 – 3,029
Lined Storage Lagoon	$ 4,463 – 5,818	$ 6,610 – 10,649
MONITORING		
Land Application	$4,293	$4,293
Land Application / Dust Abatement (DPA)	$6,134	$6,134
Dust Abatement (Lignosulfonate)	$1,841	$1,841
Percolation System (Noncontact Cooling Water)	$880	$880
Lined Storage Lagoon	$771	$771
RECORDKEEPING	$ 469	$ 1,209
PLAN REQUIREMENTS		
TDOM: Land Application	$79	$159
TDOM: Land Application / Dust Abatement (DPA)	$79	$159
TDOM: Dust Abatement (Lignosulfonate)	$79	$159
TDOM: Percolation System (Noncontact Cooling Water)	$79	$159
Solid Waste Management Method	$40	$79
Spill Prevention Method	$79	$159
ANNUALIZED TOTALS		
1A. With Dust Abatement (Lignosulfonate)	**$ 28,502 – 34,412**	**$ 39,069 – 54,281**
1B. Without Dust Abatement (Lignosulfonate)	**$ 26,193 – 32,104**	**$ 36,681 – 51,893**

Table 38: Scenario Two Total Costs

Requirement	Small	Large
TREATMENT / DISPOSAL METHODS		
POTW	$ 0	$ 0
Land Application / Dust Abatement (DPA)	$ 545 – 2,4093	$ 625 – 2,488
Dust Abatement (Lignosulfonate)	$ 468	$ 547
Percolation System (Noncontact Cooling Water)	$ 1,009 – 3,029	$ 1,009 – 3,029
Lined Storage Lagoon	$ 4,463 – 5,818	$ 6,610 – 10,649
MONITORING		
POTW	$ 1,175	$ 1,175
Land Application / Dust Abatement (DPA)	$6,134	$6,134
Dust Abatement (Lignosulfonate)	$1,841	$1,841
Percolation System (Noncontact Cooling Water)	$880	$880
Lined Storage Lagoon	$771	$771
RECORDKEEPING	$ 469	$ 1,209
PLAN REQUIREMENTS		
TDOM: Land Application	$79	$159
TDOM: Land Application / Dust Abatement (DPA)	$79	$159
TDOM: Dust Abatement (Lignosulfonate)	$79	$159
TDOM: Percolation System (Noncontact Cooling Water)	$79	$159
Solid Waste Management Method	$40	$79
Spill Prevention Method	$79	$159
ANNUALIZED TOTALS		
2A. With Dust Abatement (Lignosulfonate)	**$ 18,191 – 23,429**	**$ 21,674 – 29,596**
2B. Without Dust Abatement (Lignosulfonate)	**$ 15,882 – 21,120**	**$ 19,286 – 27,208**

Table 39: Scenario Three Total Costs

Requirement	Small	Large
TREATMENT / DISPOSAL METHODS		
Percolation System	$ 1,117 – 3,461	$ 1,117 – 3,461
Land Application / Dust Abatement (DPA)	$ 545 – 2,4093	$ 625 – 2,488
Dust Abatement (Lignosulfonate)	$ 468	$ 547
Percolation System (Noncontact Cooling Water)	$ 1,009 – 3,029	$ 1,009 – 3,029
Lined Storage Lagoon	$ 4,463 – 5,818	$ 6,610 – 10,649
MONITORING		
Percolation System	$ 1,175	$ 1,175
Land Application / Dust Abatement (DPA)	$6,134	$6,134
Dust Abatement (Lignosulfonate)	$1,841	$1,841
Percolation System (Noncontact Cooling Water)	$880	$880
Lined Storage Lagoon	$771	$771
RECORDKEEPING	$ 469	$ 1,209
PLAN REQUIREMENTS		
TDOM: Land Application	$79	$159
TDOM: Land Application / Dust Abatement (DPA)	$79	$159
TDOM: Dust Abatement (Lignosulfonate)	$79	$159
TDOM: Percolation System (Noncontact Cooling Water)	$79	$159
Solid Waste Management Method	$40	$79
Spill Prevention Method	$79	$159
ANNUALIZED TOTALS		
3A. With Dust Abatement (Lignosulfonate)	**$ 19,389 – 26,970**	**$ 22,872 – 33,137**
3B. Without Dust Abatement (Lignosulfonate)	**$ 17,080 – 24,662**	**$ 20,484 – 30,749**

Table 40: Scenario Four Total Costs

Requirement	Small	Large
TREATMENT / DISPOSAL METHODS		
Land Application	$ 7,193 – 7,865	$ 14,277 – 21,567
Land Application / Dust Abatement (DPA)	$ 545 – 2,4093	$ 625 – 2,488
Lined Evaporative Lagoon	$ 4,463 – 5,818	$ 6,610 – 10,649
Percolation System (Noncontact Cooling Water)	$ 1,009 – 3,029	$ 1,009 – 3,029
MONITORING		
Percolation System	$ 1,256	$ 1,256
Land Application / Dust Abatement (DPA)	$6,134	$6,134
Dust Abatement (Lignosulfonate)	$1,841	$1,841
Percolation System (Noncontact Cooling Water)	$880	$880
Lined Storage Lagoon	$771	$771
RECORDKEEPING	$ 469	$ 1,209
PLAN REQUIREMENTS		
TDOM: Land Application	$79	$159
TDOM: Land Application / Dust Abatement (DPA)	$79	$159
TDOM: Dust Abatement (Lignosulfonate)	$79	$159
TDOM: Percolation System (Noncontact Cooling Water)	$79	$159
Solid Waste Management Method	$40	$79
Spill Prevention Method	$79	$159
ANNUALIZED TOTALS	**$ 24,996 – 30,907**	**$ 35,485 – 50,696**

Table 41: Scenario Five Total Costs

Requirement	Small	Large
TREATMENT / DISPOSAL METHODS		
Percolation System (Noncontact Cooling Water)	$ 1,009 – 3,029	$ 1,009 – 3,029
MONITORING		
Percolation System (Noncontact Cooling Water)	$880	$880
RECORDKEEPING	$ 469	$ 1,209
PLAN REQUIREMENTS		
TDOM: Percolation System (Noncontact Cooling Water)	$79	$159
Solid Waste Management Method	$40	$79
Spill Prevention Method	$79	$159
ANNUALIZED TOTALS	**$ 2,556 – 4,576**	**$ 3,495 – 5,514**

Chapter 3: Relative Compliance Costs for Small and Large Businesses

This chapter compares the costs of compliance per employee for small businesses to the compliance cost per employee at the largest 10 percent of businesses covered by the permit. The governing rule (WAC 173-226-120) allows for this comparison to be made on one of the following bases:

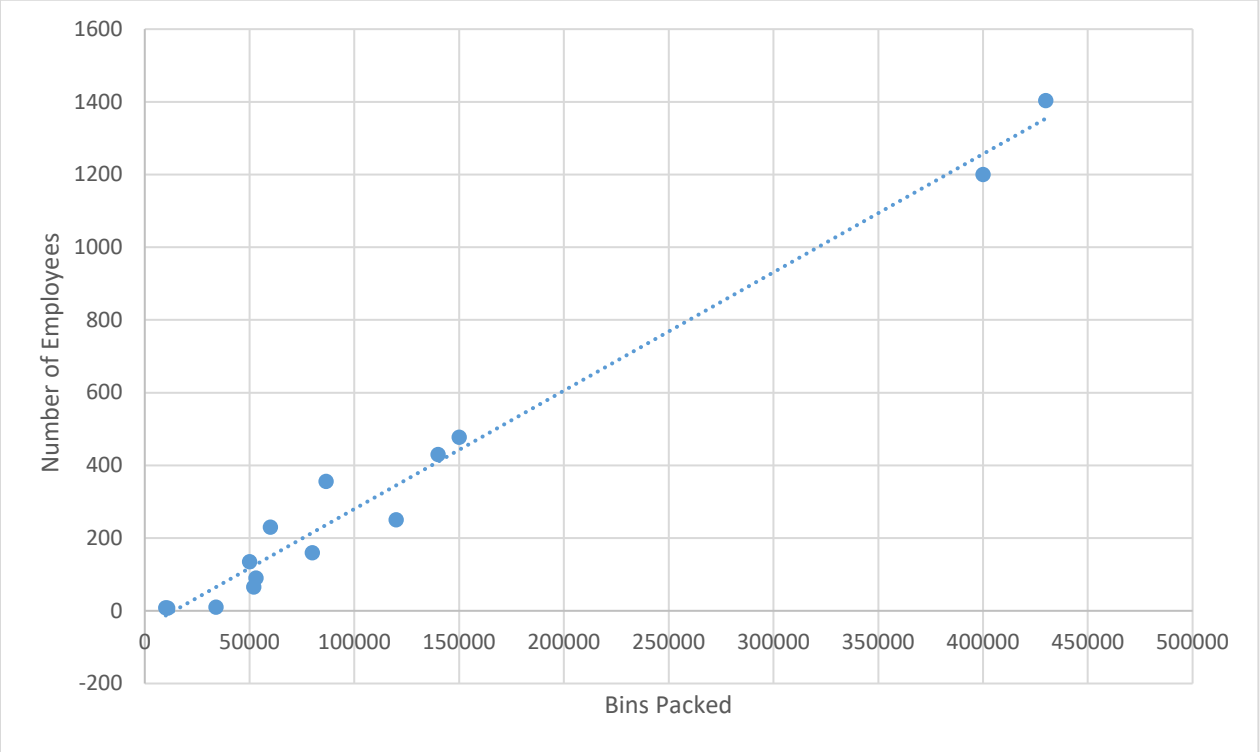
- Cost per employee
- Cost per hour of labor
- Cost per one hundred dollars of sales

We use cost per employee, because this data is readily and most comprehensively available for businesses operating in Washington State.

3.1 Business size data

Throughout this analysis, costs have been estimated by facility size. The correlation for business size and facility size is a positive (increasing) linear correlation between the number of bins packed per year and the number of employees that are on staff at any particular time. Though there may be some minor variation for the short term packing season fruits, like cherries and peaches, where the number of employees increases for a brief period without increasing the size of the facility but still increasing the business size, the variation does not impact the industry wide correlation between facility size and business size. As the number of bins packed per year, on a year round basis increases, both the business size and facility size increases on a positive linear line. Figure 1 illustrates this relationship.

Figure 1: Correlation between Facility size and Business size



There are both small and large businesses in the fresh fruit packing industry. Small businesses average 8.5 employees, and large businesses average 2,166 employees.

3.2 Relative costs of compliance

To determine the relative cost of compliance, we compare the cost per employee for small businesses to the cost per employee for large businesses.

Table 42 (below) shows total annual compliance costs for small and large facilities:

Table 42: Annualized Costs for Small and Large Businesses by Cost Scenario

Scenario	Small Businesses	Large Businesses
1A	$ 28,502 – 34,412	$ 39,069 – 54,281
1B	$ 26,193 – 32,104	$ 36,681 – 51,893
2A	$ 18,191 – 23,429	$ 21,674 – 29,596
2B	$ 15,882 – 21,120	$ 19,286 – 27,208
3A	$ 19,389 – 26,970	$ 22,872 – 33,137
3B	$ 17,080 – 24,662	$ 20,484 – 30,749
4	$ 24,996 – 30,907	$ 35,485 – 50,696
5	$ 2,556 – 4,576	$ 3,495 – 5,514

Table 43 (below) shows annual compliance costs per employee for small and large facilities:

Table 43: Annualized Costs per employee for Small and Large Businesses by Cost Scenario

Scenario	Small Businesses	Large Businesses
1A	$ 3,353 – 4,048	$ 19.04 – 25.06
1B	$ 3,082 – 3,777	$ 16.94 – 23.96
2A	$ 2,140 – 2,756	$ 10.01 – 13.66
2B	$ 1,868 – 2,485	$ 8.90 – 12.56
3A	$ 2,281 – 3,173	$ 10.56 – 15.30
3B	$ 2,009 – 2,901	$ 9.46 – 14.20
4	$ 2,941 – 3,636	$ 16.38 – 23.41
5	$ 301 - 538	$ 1.61 – 2.55

The cost-per-employee ratios fall as the number of employees increases. Ecology concluded, based on this result, that **the general permit has a disproportionate impact on small businesses**.

The cost scenarios do not cover all the possible combinations of waste streams and TDMs. However, there is no possibility that cost estimates for additional scenarios would lead to conclusions that are different from the conclusion reached above: the general permit has proportionally greater impact on small businesses than on large ones.

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Chapter 4: Mitigation of Disproportional Impacts

The general permit likely imposes disproportionate costs on small businesses, so Ecology took the legal and feasible actions described in this chapter to reduce small business compliance burden.

4.1 Mitigation options under WAC 173-226-120

The governing rule states the following options should be considered to reduce the impact of the permit on small businesses.

- Establishing differing compliance or reporting requirements or timetables for small businesses.
- Clarifying, consolidating, or simplifying the compliance and reporting requirements under the general permit for small businesses.
- Establishing performance rather than design standards.
- Exempting small businesses from parts of the general permit.

The general permit rule requiring an Economic Impact Analysis (WAC 173-226-120) states that mitigation only needs to be undertaken when it is legal and feasible in meeting the stated objectives of the federal Clean Water Act, and Chapter 90.48 RCW, the State Water Pollution Act. This provision is an important restriction. If a proposed mitigation measure violates federal law or rules, or if it violates state statutory law or rules, then it cannot be undertaken.

The conditions of the general permit based on federal rules are requirements of federal law. Significant mitigation of these conditions would be a violation of federal NPDES program rules, which establish effluent standards. Because these conditions are a consequence of federal law, they cannot be mitigated, and the compliance costs associated with them cannot be reduced. The general permit must contain effluent limits that are at least as strict as federal effluent standards, to mitigate their impact on small business.

The general permit conditions required to meet the AKART requirement of the state Water Pollution Control Act (Chapter 90.48 RCW) are also legal requirements that Ecology cannot allow facilities to violate. Thus, compliance costs based on the AKART requirement also cannot be mitigated.

Ecology also places conditions in the general permit to ensure discharges do not violate the:

- Water Quality Standards for Ground Waters of the State of Washington (Chapter 173-200 WAC)
- Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC)
- Sediment Management Standards (Chapter 173-204 WAC)
- Water Quality Permit Fees (Chapter 173-224 WAC)

These conditions are legal requirements that Ecology cannot allow facilities to violate. Compliance costs associated with these general permit conditions cannot be mitigated.

The above circumstances severely restrict Ecology's ability to reduce cost impacts on small businesses. Only costs imposed by general permit conditions that are stricter than those required by the above laws can legally be mitigated. Because, for the most part, the permit simply contains conditions needed to comply with these laws, usually only minor mitigation measures can legally be undertaken. The cost reductions that result are usually small.

The general permit rule[20] states mitigation only needs to be undertaken when it is legal and feasible in meeting the stated objectives of the federal Clean Water Act and Chapter 90.48 RCW, the State Water Pollution Control Act. Even if a proposed mitigation measure is legal, if it would limit the general permit's effectiveness in controlling water pollution too much, it should not be undertaken.

In general, the permit's impact on small fresh fruit packing facilities cannot be mitigated significantly. Because many facilities are small businesses, the economic impact of the general permit on small businesses cannot be significantly reduced without reducing the effectiveness of the general permit in controlling water pollution.

Costs could be reduced by exempting small businesses from conditions of the general permit, using less stringent requirements for small businesses, and giving small businesses more time to comply with the permit. In all of these cases, the effectiveness of the permit in reducing or preventing water pollution is reduced to some degree.

Mitigation measures for small businesses are listed in the next section. Significant mitigation measures for facilities that only store fresh fruit (only have noncontact cooling water discharge) have been incorporated into the general permit. Ecology believes these mitigation measures will not impair the effectiveness of the permit in controlling water pollution.

4.2 Mitigation actions

Ecology has taken the following actions to mitigate the compliance cost impact of the permit. These actions were taken during the development of the permit, as Ecology incorporated input from stakeholders to best achieve environmental protection while reducing compliance burden.

- Compliance schedules can be used to delay and spread out the costs of complying with the general permit.
- Facilities that only store fresh fruit (no drenching or packing) will not have to write the sections of the ECP that deal with their SPM or SWMM. Most of these facilities s are small businesses due to the lower labor requirement of fruit storage.
- Sedimentation devices are not required for discharges of noncontact cooling water to land application, percolation systems, and surface waters.

[20] WAC 173-226-120.

- The general permit's monitoring requirements have been reduced for some facilities.
- Permit fees for small businesses covered by the Fresh Fruit Packing General Permit are decreased in three ways:
    1. Facilities covered under the general permit receive a 30 percent discount on the standard fee.
    2. New general permit applicants who currently have individual permits are not required to pay application fees.
    3. Small businesses (as defined by the fee rule) can apply for fee reductions.

4.2.1 Compliance schedules

Facilities can use compliance schedules to delay and spread out the costs of complying with the general permit. The facility can be given a time period within which it must plan and implement treatment and BMPs. This is a form of mitigation, although it is not specifically aimed at small businesses.

4.2.2 Environmental compliance plan

Facilities that have only noncontact cooling water discharges, and that do not drench, will not have to write the sections of the Environmental Compliance Plan that deal with their Spill Prevention Method or their Solid Waste Management Method. These facilities typically do not have the potential for spills, and do not generate solid waste.

4.2.3 Monitoring requirements

The costs of effluent monitoring have been reduced for some facilities. In particular, facilities that only discharge noncontact cooling water to POTWs, land application, or percolation ponds are only required to monitor for free residual chlorine and pH. BMPs will satisfactorily control discharges from these facilities. In addition, requirements for soil testing were removed from the general permit.

4.2.4 Permit fees

Facilities covered under the Fresh Fruit Packing General Permit must pay permit fees under Chapter 173-224 WAC, Wastewater Discharge Permit Fees.
Fees for facilities that pack fruit depend on the median number of field bins processed per year, during the latest three years. Fees for facilities that only store fresh fruit depend on the maximum permitted volume of the facility's daily noncontact cooling water discharge. These latter facilities may choose to pay the fee for facilities that pack fruit, if that fee is lower.

Presently, permit fees for small businesses covered by the Fresh Fruit Packing General Permit are decreased in three ways:

a. Facilities covered under the general permit receive a 30 percent discount on the standard fee.

b. New general permit applicants who currently have individual permits are not required to pay application fees.

c. Small businesses (as defined by the fee rule) can apply for fee reductions.

The permit fee schedule allows small businesses to apply for fee reductions. Under the current fee schedule, a small business is defined as one that meets all of the following requirements:

- It is a corporation, partnership, or sole proprietorship formed for the purpose of making a profit.
- It is independently owned and operated from all other businesses.
- It has fifty or fewer employees.
- It has annual sales of $500,000 or less of the goods produced using the processes regulated by the wastewater discharge permit.

The fees of eligible businesses are reduced to 50 percent of the permit fee or $250; whichever is greater. Because small fresh fruit packing facilities tend to be small businesses (they produce fewer bins and have lower sales at the median than large businesses), some small facilities should be able to qualify for fee reduction.

References

RCW 34.05.272 requires Ecology to categorize sources of information used in significant agency actions made in the Water Quality Program.

Independent peer review: Review is overseen by an independent third party.

Internal peer review: Review by staff internal to Ecology.

External peer review: Review by persons that are external to and selected by Ecology.

Open review: Documented open public review process that is not limited to invited organizations or individuals.

Legal and policy documents: Documents related to the legal framework for the significant agency action, including but not limited to: federal and state statutes, court and hearings board decisions, federal and state administrative rules and regulations, and policy and regulatory documents adopted by local governments.

40 CFR 122.44: Establishing limitations, standards, and other permit conditions.[21]

40 CFR 131.36: Toxics criteria for those states not complying with Clean Water Act section 303(c)(2)(B) .[22]

Chapter 173-200 WAC: Water quality standards for groundwaters of the state of Washington.[23]

Chapter 173-201A WAC: Water quality standards for surface waters of the state of Washington.[24]

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[21] 40 CFR 122.44: https://ecfr.federalregister.gov/current/title-40/chapter-I/subchapter-D/part-122#122.44
[22] 40 CFR 122.44: https://ecfr.federalregister.gov/current/title-40/chapter-I/subchapter-D/part-131#131.36
[23] Chapter 173-226 WAC: https://apps.leg.wa.gov/wac/default.aspx?cite=173-226
[24] Chapter 173-201A WAC: https://apps.leg.wa.gov/WAC/default.aspx?cite=173-201A

Chapter 173-204 WAC: Sediment management standards.[25]

Chapter 173-224 WAC: Water quality permit fees.[26]

Chapter 173-226 WAC: Waste discharge general permit program.[27]

Chapter 90.48 RCW: Water Pollution Control.[28]

Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under independent, internal, or external peer review.

U.S. Census Bureau (2017). North American Industry Classification System. http://www.census.gov/eos/www/naics/

U.S. Department of Commerce: Bureau of Economic Analysis (2021). Gross National Product: Implicit Price Deflator. http://research.stlouisfed.org/fred2/data/GNPDEF.txt

U.S. Treasury (2021): Historical I-bond Rates: https://www.treasury.gov/resource-center/data-chart-center/Pages/index.aspx

Records of the best professional judgment of Ecology employees or other individuals.

Other: Sources of information that do not fit into other categories.

[25] Chapter 173-204 WAC: https://apps.leg.wa.gov/WAC/default.aspx?cite=173-204
[26] Chapter 173-224 WAC: https://apps.leg.wa.gov/WAC/default.aspx?cite=173-224
[27] Chapter 173-226 WAC: https://app.leg.wa.gov/wac/default.aspx?cite=173-226
[28] Chapter 90.48 RCW: https://apps.leg.wa.gov/RCW/default.aspx?cite=90.48