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Economic Impact Analysis

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

Fresh Fruit Packing Industry

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Economic Impact Analysis National Pollution Discharge Elimination System (NPDES) Wastewater Discharge General Permit

Fresh Fruit Packing Industry

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List of 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

The Economic Impact Analysis (EIA) compares the costs of compliance for small and large businesses to determine whether the Fruit Packers General Permit disproportionately impacts small businesses. This is the fundamental requirement the EIA satisfies.

Cost

Depending on the cost scenario faced by a permit holder (the number and type of waste streams and choice of treatment/disposal method), Ecology determined annualized compliance costs may range from **$2 to 27 thousand for small businesses** and **$4 to 45 thousand for large businesses**. However, as most fruit packers are already in compliance with most, if not all, of the requirements of this general permit, Ecology does not expect facilities to actually incur these costs.

Ecology used cost-to-sales ratio as the measure of proportionate impact. It is an estimate of the percentage rise in costs caused by the general permit. This is likely to be how the permit holder looks at compliance costs.

Cost-to-Sales

To calculate the cost-to-sales ratio, Ecology divided annualized compliance cost by median annual sales. The cost-to-sales ratios fall as sales rise, so larger businesses – which employ more people, but produce disproportionately more bins of fruit – incur a lower cost per $100 of sales. Ecology therefore concluded that **the general permit has a disproportionate impact on small businesses**. For all project scenarios evaluated, Ecology estimated large business costs were between 65 percent and 75 percent lower than small business costs, per $100 of sales.

Ecology determined **the conclusion is independent of the particular cost scenario** because, while sales differ dramatically between the typical small and typical large business, individual compliance costs differ relatively little. Therefore, irrespective of the cost scenario, small businesses will always be disproportionately impacted, relative to large businesses.

Mitigation

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

Significant mitigation measures for facilities that only store 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.

Measures taken to reduce disproportionate costs include changes to:

- Requirements for compliance schedules
- The Environmental Compliance Plan
- Monitoring requirements
- Permit fee

Chapter 1: The General Permit for Fresh Fruit Packers

1.1 Introduction

Washington Administrative Code (WAC) 173-226-120 requires an economic analysis of any proposed water-quality permit intended to directly cover small businesses to serve three purposes. The analysis must:

- Explain the compliance requirements of the general permit.
- Estimate the economic impact on small and large businesses and, to the extent possible, determine whether the permit is expected to have a disproportionate impact on small businesses.
- 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 permit.

A small business is defined 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.

1.2 Necessity to comply with state and federal laws and rules

The general permit rule states that mitigation only needs to be undertaken when it is legal and feasible in meeting the state's objectives of the Federal Water Pollution Control Act (FWPCA) as amended, 33 U.S.C. §1251 et seq. and chapter 90.48 Revised Code of Washington (RCW). Mitigation can come in the form of:

a) Establishing differing compliance of reporting requirements or timetables for small businesses;
b) Clarifying, consolidating, or simplifying the compliance and reporting requirements under the general permit for small businesses;
c) Establishing performance rather than design standards; and/or
d) Exempting small businesses from parts of the general permit.

Mitigation in these forms cannot, however, violate state or federal law or rules. In such cases, mitigation is not required.

Federal National Pollutant Discharge Elimination System (NPDES) rules set effluent standards for discharges to surface waters. The conditions of general permits that are contained in federal rules are requirements of federal law. They cannot be mitigated and the compliance costs related to them cannot be reduced. There is no provision in federal law that allows violation of federal effluent standards in order to mitigate their impact on small businesses.

Conditions required to meet the *All known, available, and reasonable methods of prevention, control, and treatment* (AKART) requirement of the state Water Pollution Control Act (RCW 90.48.010) are also legal requirements that Ecology cannot allow permit holders to violate. Compliance costs related to permit conditions based on the AKART requirement also cannot be mitigated.

Ecology also places conditions in general permits to ensure that dischargers do not violate the following state standards:

- 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)
- Wastewater Discharge Permit Fees (Chapter 173-224 WAC)

These conditions are legal requirements that Ecology cannot allow permit holders to violate. Compliance costs associated with these permit conditions cannot be mitigated. The cost of complying with the water quality standards cannot be considered when setting water-quality-based effluent limits.

1.3 Scope of the analysis

Only costs imposed by permit conditions that are stricter than those required by state and federal laws and rules, and state water quality standards can legally be mitigated. Ecology has, therefore, limited the scope of this Economic Impact Analysis to the compliance costs associated with the general permit conditions that exceed state and federal legal requirements.

1.4 Fresh fruit packing and water pollution

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 fruit packers was first issued in 1994, and has been reissued approximately every five years since that date, along with an economic analysis of the general permit's impacts.[1] Prior economic analyses of the differential 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 2009 (Small Business Economic Impact Statement for the Fresh Fruit Packing General Permit, 2009[2]). Ecology believes this will maintain consistent

[1] Only the 1993 and 2009 general permits necessitated an Economic Impact Analysis.
[2] Publication number 09-10-017

methodology and assumptions across analyses, while updating to current industry characteristics and prices.

Fruit packers pack and store the following types of fruit:

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

Apples and pears are the primary fruits processed by Washington fruit packers. Most fruit packers are located in the central region of the state along the Columbia, Okanogan, Wenatchee, and Yakima rivers. Currently, about 184 fruit packer facilities – owned by 107 businesses – are covered under this permit.[3]

Fruit packing has six basic waste streams including:

- Drencher
- Float tank
- Flumes
- Non-contact cooling water
- Process lines (wash, rinse, pack) and cleanup
- Stormwater

Fruit packers use anti-oxidants, fungicides, density enhancers, disinfectants, biocides, waxes, and cleaners. The chemicals that are used most frequently by fruit packers include:

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

Starting in 2016, the permit allows the use of the fungicide Difenoconazole, which was approved for use by the EPA in April, 2015.[4]

Fruit packers 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.

[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] For more information on Difenoconazole, see its publication in the Federal Register at: https://www.federalregister.gov/articles/2015/08/26/2015-21078/difenoconazole-pesticide-tolerances

Packers 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):

- Lined evaporative lagoons
- Dust abatement
- Publicly owned treatment works (POTWs)
- Land application
- Percolation systems
- Surface water

These treatment and disposal methods are described further below.

1.4.1 Lined evaporative lagoons

Lined evaporative lagoons are "impervious, engineered structures which rely upon 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 are the only TDM 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. In addition, the general permit places effluent limits on flow. They require two feet of freeboard.

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.

1.4.2 Dust abatement

Dust abatement is the application of waste water to unpaved bin storage lots and unpaved roads for the purpose of dust suppression. This TDM is allowed for most regulated waste streams, except for the following three instances:

- Pear packing using potassium phosphate (with or without chlorine or SOPP) in float water;
- Noncontact cooling water with priority pollutants, dangerous wastes, or toxics in toxic amounts; and
- Drencher and dip tanking or apple and cherry packing with Difenoconazole.

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

A Road Management Plan (RMP) describes the site-specific conditions for the application of all waste streams that principally contain lignosulfonate, sodium silicate, or DPA. A separate RMP must be written for each dust abatement application site, and for each separate waste water type. The RMP must also be periodically reviewed and updated by the permit holder.

1.4.3 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 discharge of waste water that will be treated at the POTW.

This TDM is allowed for limited waste streams and chemicals, and is not allowed for drenchers and dip tank water discharges. The general permit places 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.

1.4.4 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 permit holder cannot apply it to the land.

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

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

The general permit places 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.

1.4.5 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, and other relevant parameters.

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

1.4.6 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.

This TDM is limited to few types of discharge, and one conditional 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. Finally, noncontact cooling water without priority pollutants, dangerous wastes, or toxics in toxic amounts may also be discharged in this fashion.

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.

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

1.5 Monitoring

The general permit contains monitoring requirements, as well as effluent limits. For discharges to POTWs, the strictest effluent limit (the state or the local) applies.

1.5.1 Effluent monitoring

Monitoring requirements and effluent limits are specific to the type of wastewater TDM used by the permit holder. 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 monitoring frequency may be reduced to annual, except for discharges to surface waters. This reduction in frequency is available if, during the first year, both:

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

1.5.2 Stormwater monitoring

All permit holders that have stormwater that discharges directly to surface waters or to a storm sewer system are subject to coverage under the Washington State Industrial Stormwater General Permit (ISGP) and shall apply for coverage under that permit.[5] 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.

1.6 Recordkeeping

The general permit sets requirements for recordkeeping for each permitted facility. These requirements include retention of records and specifications for reporting.

1.6.1 Records retention

The permit holder 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.

1.6.2 Facility logbook

The permit holder 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.

[5] For more information, please refer to: http://www.ecy.wa.gov/programs/wq/stormwater/industrial/index.html

1.6.3 Annual discharge monitoring report

The information in the facility logbook (described above) is used to produce the Annual Discharge Monitoring Report (ADMR). Permit holders 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 processes of management.
- Results of all required discharge monitoring.
- Copies of letters stating the permit holder 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.

1.7 Plan requirements

Each permit holder must develop an Environmental Compliance Plan (ECP). The ECP consists of three methods:

1. Treatment/Disposal Operations Method (TDOM).
   All permit holders must write a TDOM, retain it on-site, and periodically review and update it.
2. Solid Waste Management Method (SWMM).
   Most permit holders must write a SWMM, and periodically review and update the document. Facilities that only store fruit (no drenching or packing) will not have to write a SWMM.
3. Spill Prevention Method (SPM).
   Most permit holders must 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 permit holders that discharge stormwater, the Industrial Stormwater General Permit (ISGP) stipulates that the ECP must also include a Stormwater Pollution Prevention Method (SWPPM).

Chapter 2: Economic Impact Analysis Overview

2.1 Introduction

This Economic Impact Analysis (EIA) estimates the costs of complying with the general permit. It also compares the costs of complying with the permit for small businesses to the costs of compliance for large businesses, in order to determine whether the permit disproportionately impacts small businesses. This chapter contains introductory remarks on the cost estimation and explains how expected sales for small and large fruit packers are estimated.

2.2 The fresh fruit packing industry

Fruit packers pack and store the following fruits:

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

Apples, pears, and cherries are the primary fruits processed by Washington State fruit packers.

Tables 1 – 3 (below) show production, prices, and value of production for apples, pears, and sweet cherries for the 2001 – 2011 period.[6] These statistics show the relative amounts of the various types of fruits processed by Washington's primary types of fruit packers.

Table 1: Washington Apple Production

Washington Apple Production			
Year	**Utilized Production (million pounds)**	**Price (cents per pound)**	**Total Value (thousand $)**
2001	5,050	17.8	900,250
2002	5,100	20.1	1,023,000
2003	4,550	21.9	998,020
2004	6,150	12.2	751,615
2005	5,700	17.9	1,022,704
2006	5,550	25.3	1,403,282
2007	5,200	34.2	1,780,420
2008	5,650	22.8	1,288,128
2009	5,200	27.2	1,412,846
2010	5,550	26.0	1,443,890
Source: USDA National Agricultural Statistics Service. http://www.nass.usda.gov/Statistics_by_State/Washington/Historic_Data/fruit/apples.pdf			

[6] More recent statistics were unavailable. Dollars are shown in the year of measurement

Table 2: Washington Pear Production

Washington Pear Production			
Year	**Utilized Production (tons)**	**Price ($ per ton)**	**Total Value (thousand $)**
2001	443,000	245	108,627
2002	389,000	299	116,437
2003	422,000	306	129,152
2004	366,000	350	128,005
2005	413,000	344	142,006
2006	361,000	441	159,231
2007	402,000	443	178,224
2008	377,000	453	170,734
2009	452,000	350	158,336
2010	390,000	481	187,591
2011	457,000	408	186,269
Source: USDA National Agricultural Statistics Service. http://www.nass.usda.gov/Statistics_by_State/Washington/Historic_Data/fruit/pearsall.pdf			

Table 3: Washington Cherry Production

Washington Sweet Cherry Production			
Year	**Utilized Production (tons)**	**Price ($ per ton)**	**Total Value (thousand $)**
2001	106,000	1,360	144,072
2002	87,000	1,650	143,226
2003	118,000	1,430	169,118
2004	134,000	1,770	236,609
2005	137,000	2,440	334,512
2006	168,000	1,590	267,794
2007	157,000	2,060	323,128
2008	100,000	2,930	292,936
2009	210,000	1,060	223,235
2010	156,000	2,330	363,693
2011	196,000	2,690	526,986
Source: USDA National Agricultural Statistics Service. http://www.nass.usda.gov/Statistics_by_State/Washington/Historic_Data/fruit/chersw.pdf			

2.3 Definitions of small and large fruit packers

A small business is defined as one with 50 or fewer employees. There are both small and large businesses in the fruit packing industry. Fruit packers differ widely in size. This is true whether size is measured by the number of bins of fruit processed per year, or by value of fruit processed per year. This section presents some statistics that show the wide variation in the size of fruit packers.

Table 4 (below) shows Department of Employment Security data on the number of establishments under the general permit with fewer than 50 employees, and with 50 or more employees. Employment Security data is reported at the facility level, so this table also displays small and large business information by firm, as well, because a single firm may own and operate multiple facilities in the fruit packing industry. Ecology expects that firm-level employment and production data will better reflect cost impacts and firms' ability to cope with compliance costs than facility-level data would.

Table 4: Small and Large Facilities and Businesses

Small and Large Facilities and Businesses		
Employees	**Number of Facilities**	**Number of Businesses**
Less Than 50	31	26
50 or More	93	70
Unreported	60	11
Source: Washington State Employment Security Department, Workforce Explorer. http://www.workforceexplorer.com/aspdotnet/databrowsing/empMain.aspx?menuChoice=emp		

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 5.

Table 5: Impacted Industries by NAICS

Impacted Industries NAICS Codes		
111331	115114	488991
111339	424480	493110
111998	424490	493120
112112	445230	
Source: Washington State Employment Security Department, Workforce Explorer. http://www.workforceexplorer.com/aspdotnet/databrowsing/empMain.aspx?menuChoice=emp		

When Ecology collects wastewater discharge permit fees, we also collect data on the number of bins of all fruits each permitted fruit packer processes annually. Complete and accurate information on the sales of all fresh fruit packing facilities (whether under general permit or not) is not available. This data was used to calculate the following distribution of fruit packers by size (shown in Table 6, below).[8] Note that 21 businesses only store fruit, and therefore have a production of zero.

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

[8] The bins produced are a sum of apple, pear, and cherry production. As cherry production was reported in pounds rather than bins, Ecology assumed an average weight of 400lbs of fruit per bin.

Table 6: Annual Bins of Fruit by Business Size

Annual Bins Produced by Business Size		
	Small Business (fewer than 50 employees)	**Large Business (50 or more employees)**
Bins Produced	**Number of Businesses**	**Number of Businesses**
None (storage only)	18	3
1,000 - 50,000	4	9
50,001 - 100,000	2	14
100,001 - 150,000	0	9
150,001 - 200,000	0	10
200,001 +	0	10
Source:		
Ecology general permit records of annual bins produced, by facility. Note: Ecology used the largest available bin number for each business, to account for businesses with multiple facilities performing different production steps at each facility.		

Ecology determined the number of bins at a facility is correlated with the number of employees. When data on the number of bins produced was subdivided by number of employees (fewer than 50, and 50 or more), small businesses produced fewer bins at the median than large businesses produced. The Table 7 (below) uses this information to define small and large businesses in terms of bins and the annual value of fruit produced. [9]

Table 7: Definitions of Small and Large Fruit Packers in Bins and Value

Definitions of Small and Large Fruit Packers in Bins and Value			
Business Size	**Median Number of Bins**	**Average Price (2016 $/lb.)**	**Annual Value (2016$)**
Small	22,000	$ 2.00	$ 17,619,749
Large	107,000	$ 2.00	$ 85,696,051
Note: The average price used here is the average price per pound for primary Washington fruits, adjusted to 2016 price levels and averaged over the 2009-2015 time period. Ecology assumes that the average bin holds 400lbs of fruit. Source: Bureau of Labor Statistics, historical price data for apples, cherries, and pears. http://www.bls.gov/regions/mid-atlantic/data/AverageRetailFoodAndEnergyPrices_USandMidwest_Table.htm			

This conversion to bins allowed Ecology to examine proportional impacts for small and large businesses in terms of both costs per employee, and costs per $100 of sales. Since the number of bins is related to both employment and annual sales, as well as being a determinant of compliance costs, conversion to bins was used in this analysis.

Ecology calculated the annual value of fruit by multiplying the number of bins by the average price per bin over the 2009 – 2015 period. The average price over this period was $2.00 per

[9] The median values excludes those businesses that only store fruit.

pound. Annual total compliance costs will be divided by these sales figures to calculate the ratio of cost to sales (per $100 of sales) for small versus large fruit packers.

Ecology used cost calculation methodologies from the original analysis of this general permit, which were based on lower productivity by both small and large fruit packers. While the nominal number of bins produces by both types of business have increased, the ratio of small to large firm production is consistent with past ratios of production.

Moreover, Ecology determined that using the smaller original production numbers to inform calculations generates conservative estimates, as it reflects fewer economies of scale for the small businesses. Ecology could not determine the extent to which economies of scale increase with production, and so chose to conservatively base cost calculations on production numbers that reflected fewer economies of scale for small businesses.

The sample of businesses with both firm-level employment and production data available to Ecology was small (less than 100). Therefore, Ecology did not use the top ten percent of large businesses, as they are not likely to be representative of large businesses as a whole – within and beyond the sample data that was used. Instead, Ecology used the larger comparison population of all large businesses in the sample with more than 50 employees.

2.4 Compliance costs that must be included in the EIA

According to WAC 173-226-120, the EIA 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) is as 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.

2.5 Compliance costs that must be excluded from the EIA

The costs of complying with general permit conditions required by the following laws and rules are not included in the EIA's analysis of compliance costs.

- 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)
- Wastewater Discharge Permit Fees (Chapter 173-224 WAC)
- Federal laws and rules, in particular the Clean Water Act and federal NPDES rules

The justification for excluding compliance costs related to these laws and rules is that permit holders cannot be exempted from these laws through the permit process and, therefore, any cost impacts of these laws and rules cannot be mitigated. General permit holders must comply with existing rules independent of permit requirements.

Ecology expects existing fruit packers under the 2009 – 2016 general permit to already be in compliance with the majority of the new general permit's requirements. They have already incurred some or all of the costs of complying with the general permit. However, even though a certain compliance cost has been incurred in the past, it is still a cost of compliance. It is not a cost the fruit packer must incur to pack fruit, but rather a cost the packer incurs to comply with water pollution control laws. When existing equipment must be replaced, it will be replaced based on the most recent permitted standards.

2.6 State and federal water pollution rules

The federal Clean Water Act requires that dischargers to surface waters obtain National Pollutant Discharge Elimination System (NPDES) permits. NPDES rules establish technology-based effluent standards. At a minimum, Ecology's fruit packing general permit must impose a level of pollution control that is at least as strict as that set by federal laws and rules.

Ecology must also ensure AKART levels of pollution control are established in the general permit. AKART is a state requirement (see RCW 90.48.010). AKART may be stricter than federal effluent standards; it cannot be less strict.

In addition, all permits issued by Ecology must ensure dischargers do not violate the following state laws:

- 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)

The federal effluent standards, NPDES rules, the state AKART requirement, and the surface water standards, ground water standards, and sediment standards are not impacted by the general permit.

2.7 Cost scenarios

The required BMPs and effluent limits may cause some fruit packers 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 fruit packers are estimated in this document, Ecology does not expect these costs to actually be incurred by the majority of existing facilities.

For the purposes of cost estimation, Ecology assumes no fruit packers will switch from their current TDMs for process waste water to discharging to surface waters, POTWs, or percolation systems. Ecology does not expect packers 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 packers 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 8 – 10 (below) list the characteristics of five TDM scenarios. Ecology estimated TDM compliance costs for these five scenarios. The scenarios describe common situations in the fruit packing industry, and account for packers using 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.

Table 8: Scenario One

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 9: Scenario Two

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 10: Scenario Three

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 each of Scenarios One through 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 relatively new to the industry. This includes Captan, Dichloran, Penbotec, and Scholar, which were included in the 2009 general permit, and Difenoconazole, which is new in the 2016 general permit.

Table 11: Scenario Four

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

For Scenario Five, Ecology assumed that the facility does not pack or drench, but rather 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 12: Scenario Five

Scenario Five	
Waste stream	**TDM**
Noncontact Cooling Water	Percolation

Chapter 3: Economic Impact Analysis Calculations

3.1 Introduction

Compliance costs are dependent on size of the fruit packer, as measured by bins processed. Compliance costs are also dependent on the number, type, and volume of waste streams generated by the packer. Ecology expects these to vary significantly across fruit packers.

The amount of waste water generated by a fruit packer is dependent on the production practices used and the number of bins processed. Production practices can vary significantly across packers. Two packers 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 packers, and the high cost estimate is for large packers, as measured by the median number of bins processed by packers with under 50 employees, versus packers with over 50 employees. The cost estimates do not take into account all the fruit packer characteristics and conditions that can cause compliance costs to vary. Ecology expects estimates to be accurate for the typical firm.

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 fruit packers.

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 that fruit packers incur every year. In addition, 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.[10]

Ecology estimated labor costs using two wage rates. For manual labor, including task such as removing sludge or taking samples, Ecology used $16.10 per hour, which is the Bureau of Labor Statistics (BLS) median hourly wage for material moving occupations.[11] For managerial work,

[10] 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 September 2006 and November 2016.

[11] United States Bureau of Labor Statistics, May 2014. “May 2014 State Occupational Employment and Wage Estimates” for Washington State.

such as writing a compliance plan, Ecology used the average hourly wage of $40.98, which is the BLS median hourly wage for engineering and architecture occupations.[12]

3.2 Process waste water treatment and disposal methods

Fruit packers 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 fruit packers 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.

3.2.1 Costs: lined evaporative lagoon

Nearly all fruit packer waste streams can be discharged to evaporative lagoons. However, Lignosulfonate (with or without SOPP) in float waste water may not be discharged to evaporative lagoons. Lagoons are the only TDM 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 permit holders 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.

[12] *Ibid.*

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 industry; estimates were consistent with real-world costs.

Ecology used the following assumptions in making cost estimates:[13,14]

- Low-volume lagoons (2,000 and 24,000 gallons) will cost between $0.57 and $0.84 per gallon to construct.
- High-volume lagoons (100,000 and 300,000 gallons) will cost between $0.09 and $0.25 per gallon to construct.
- All lagoons have a usable lifetime of 20 years.

Tables 13 and 14 (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 13: Cost Estimate – Evaporative Lined Lagoon (Low Volume)

Cost Estimate -- Evaporative Lined Lagoon (Low Volume)					
Business Size	Gallons	Capital Cost		Annualized Cost	
		Low	High	Low	High
Small	2,000	$ 1,262	$ 1,857	$ 83	$ 123
Large	24,000	$ 15,145	$ 22,282	$ 1,000	$ 1,471

Table 14: Cost Estimate – Evaporative Lined Lagoon (High Volume)

Cost Estimate -- Evaporative Lined Lagoon (High Volume)					
Business Size	Gallons	Capital Cost		Annualized Cost	
		Low	High	Low	High
Small	100,000	$ 9,802	$ 27,312	$ 647	$ 1,804
Large	300,000	$ 29,405	$ 81,937	$ 1,942	$ 5,411

[13] 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 2016.

[14] 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.

Land

Ecology assumed that land for building the lagoon costs between $880 and $2,300 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 assumes 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 that 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 15: Cost Estimate-- Land for Lagoon

Cost Estimate: Cost of Land for Lagoon				
Size	Capital Cost		Annualized Cost	
	Low	High	Low	High
2,000 gallons	$ 0	$ 0	$ 0	$ 0
24,000 gallons	$ 0	$ 0	$ 0	$ 0
100,000 gallons	$ 441	$ 1,151	$ 14	$ 38
300,000 gallons	$ 881	$ 2,302	$ 29	$ 76

Sludge Disposal

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

Assuming DPA is recycled (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 $32.20 per year at a wage rate of $16.10 per hour. Removing sludge from a large lagoon (24,000 gallons) will take eight hours per year, and cost $128.80 per year.

Assuming DPA is not recycled and the facility has a high-volume lagoon, Ecology estimates that removing sludge from a small lagoon (100,000 gallons) will require 8 hour of work every 5 years; equating to an annualized cost of $28 at a wage rate of $16.10. Removing sludge from a large lagoon (300,000 gallons) will require 16 hours of work every 5, years equating to an annualized cost of $56 per year.

Fencing

The lagoon must be enclosed by a fence. Ecology assumed that a fence is a six-foot high, chain link fence. Table 16 contains the cost estimates:

Table 16: Cost Estimate – Fence

Cost Estimate – Fence for Low Volume Lagoons (DPA recycle)				
Gallons	**Fence Length (feet)**	**Price per Foot**	**Capital Cost**	**Annualized Cost**
2,000	48	$ 36.02	$ 1,729	$ 201
24,000	120	$ 25.25	$ 3,030	$ 352
Cost Estimate – Fence for High Volume Lagoons (no DPA recycle)				
100,000	480	$ 20.92	$ 10,044	$ 1,166
300,000	720	$ 20.30	$ 14,614	$ 1,697
Source:				
US Bureau of Labor Statistics, Consumer Price Index for 2008 and 2016				

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

Operations and Maintenance Labor

The drencher waste water must be pumped into a tank, and then taken to the lagoon. This work only occurs during the time of the year when the drencher is being used.

Assuming DPA is recycled (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 $16.10 per hour, this work costs $129 per year.

Assuming DPA is not recycled (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 $16.10 per hour, this work costs $1,932 per year.

Total Cost: Lined Evaporative Lagoon

Tables 17 and 18 (below) show the annualized costs of constructing and using a lined evaporative lagoon under the general permit, with and without DPA recycling:

Table 17: Total Cost Estimate – Evaporative Lined Lagoon (Low Volume, DPA Recycling)

Total Cost Estimate -- Evaporative Lagoon (Low Volume)		
Requirement	**Small Business (2,000 gallon)**	**Large Businesses (24,000 gallon)**
Construction	$ 83 - 123	$ 1,000 – 1,471
Fence	$ 201	$ 201
Land	$ 0	$ 0
Sludge Disposal	$ 32	$ 129
O & M -- Labor	$ 129	$ 129
TOTAL	**$ 445 - 484**	**$ 1,610 - 2,081**

Table 18: Total Cost Estimate – Evaporative Lined Lagoon (High Volume, No DPA Recycling)

Total Cost Estimate -- Lined Evaporative or Storage Lagoon (High Volume)		
Cost Element	**Small Business (100,000 gallon)**	**Large Business (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**

3.2.2 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 EIA, Ecology assumed all packers 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

A Road Management Plan (RMP) must be written for each separate dust abatement application site, and for each separate waste water type. Ecology assumed each permit holder that used these waste waters for dust abatement must write one RMP. Table 19 shows the calculations made in estimating the cost of writing the RMP. Ecology assumed the wage rate for this level of work was $40.98 per hour. Costs are annualized over the five-year term of the permit using a 2.81 percent discount rate.

Table 19: Cost Estimate – Road Management Plan

Cost Estimate -- Road Management Plan			
Size	**Hours**	**Cost**	**Annualized Cost**
Small	8	$ 328	$ 71
Large	16	$ 656	$ 142

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 $16.10 per hour.

For application of only lignosulfonate or similar chemicals, Ecology estimated two hours per week, for ten weeks. The annual labor cost is $322.

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 $483.

If the facility recycles DPA drencher waste water, then for application of only DPA, the amount of labor required is four hours per every 60-day period each year. The annual labor cost is $386.

If the facility does not recycle DPA drencher waste water, then for application of only DPA, the amount of labor required is two hours per day, for a 60-day period each year. The annual labor cost is $1,932.

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 permit holders 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 20 summarizes the cost of a high-volume lined storage lagoon:

Table 20: Cost Estimate – Lined Storage Lagoon

Total Cost Estimate -- Lined Evaporative or Storage Lagoon (High-Volume)		
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

For the purposes of the EIA, Ecology assumed there are four possible waste streams fruit packers can use for dust abatement application:

1. Lignosulfonate and similar chemicals
2. Penbotec or Scholar
3. DPA drencher with recycling of DPA
4. DPA drencher with no recycling of DPA

Tables 21 – 24 (below) summarize the annualized costs of dust abatement application under the general permit:

Table 21: Total Cost Estimate – Dust Abatement (Lignosulfonate)

Total Cost Estimate -- Dust Abatement (Lignosulfonate)		
Requirement	**Small**	**Large**
Road Management Plan	$ 71	$ 142
Application BMPs -- Labor	$ 322	$322
TOTAL	**$ 393**	**$ 464**

Table 22: Total Cost Estimate – Dust Abatement (Penbotec or Scholar)

Total Cost Estimate -- Dust Abatement (Penbotec or Scholar)		
Requirement	**Small**	**Large**
Road Management Plan	$ 71	$ 142
Application BMPs -- Labor	$ 483	$ 483
TOTAL	**$ 554**	**$ 625**

Table 23: Total Cost Estimate – Dust Abatement (DPA Recycling)

Total Cost Estimate -- Dust Abatement (DPA with recycling)		
Requirement	**Small**	**Large**
Road Management Plan	$ 71	$ 142
Application BMPs -- Labor	$ 386	$ 386
TOTAL	**$ 458**	**$ 529**

Table 24: Total Cost Estimate – Dust Abatement (No DPA Recycling)

Total Cost Estimate -- Dust Abatement (DPA without recycling)		
Requirement	**Small**	**Large**
Road Management Plan	$ 71	$ 142
Application BMPs -- Labor	$ 1,932	$ 1,932
TOTAL	**$ 2,003**	**$ 2,074**

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

A limited number of waste streams and chemicals can be discharged to POTWs. Drencher or dip tank waste water, however, cannot be discharged to POTWs; nor can Captan, Dichloran, Penbotec, Scholar, Difenoconazole, lignosulfonate in floats, or potassium phosphate, sodium sulfate, or sodium silicate in floats, or noncontact cooling water containing priority pollutants or toxics at significant levels.

Permit holders 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 fruit packers 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.

3.2.4 Land application

Most fruit packer 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 25 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 25: Cost Estimate – Sedimentation Device

Cost Estimate -- Sedimentation Device		
Size	**Capital Cost**	**Annualized Cost**
Low	$ 809	$ 94
High	$ 3,238	$ 376
Source:		
US Bureau of Labor Statistics, Consumer Price Index for 2009 and 2016.		

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 $16.10 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 $11,753. For small facilities, Ecology assumed the amount of labor required is one hour per day throughout the year. The annual labor cost is $5,877.

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 packers must purchase equipment, or upgrade it, the cost is necessary for compliance if waste streams are land-applied. Sprinkler irrigation is the most appropriate system for fruit packing waste waters. From communications with industry, Ecology estimated that a sprinkler system costs an average of $3,000 per acre irrigated. Table 26 (below) shows the calculations made in estimating this cost. Costs are annualized over ten years, using a 2.81 percent interest rate.

Table 26: Cost Estimate – Application BMPs (Equipment)

Cost Estimate -- Application BMPs (Equipment)			
Size	**Number of Acres to Irrigate**	**Total Cost**	**Annualized Costs**
Small	1	$ 3,000	$ 348
Large	20	$ 60,000	$ 6,996
Source:			
US Bureau of Labor Statistics, Consumer Price Index for 2009 and 2016			

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 permit holders 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 3.2.1. Table 27 (below) summarizes the cost of a high-volume lined storage lagoon:

Table 27: Cost Estimate – Lined Storage Lagoon

Total Cost Estimate -- Lined Evaporative or Storage Lagoon (High-Volume)		
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 28 shows the annualized cost of land application in accordance with the conditions of the general permit:

Table 28: Total Cost Estimate – Land Application

Total Cost Estimate -- Land Application		
Requirement	**Small**	**Large**
Sedimentation Device	$ 94 - 376	$ 94 - 376
Application BMPs -- Labor	$ 5,877	$ 11,753
Application BMPs -- Equipment	$ 0 - 756	$ 0 - 3,025
TOTAL	**$5,970 - 7,009**	**$ 11,847 - 15,154**

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

3.2.5 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 EIA, 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 3.2.4. 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 permit holder must install ground water monitoring wells. Table 29 (below) shows the calculations made in estimating the cost of ground water monitoring. Costs are annualized over the five years of the permit term, using a 2.81 percent interest rate.

Table 29: Cost Estimate – Ground Water Monitoring

Cost Estimate -- Ground Water Monitoring		
Amount of Contamination	**Capital Cost**	**Annualized Cost**
None	$ 0	$ 0
Low	$ 1,619	$ 352
High	$ 8,095	$ 1,758
Source:		
US Bureau of Labor Statistics, Consumer Price Index for 2008 and 2016		

Effluent Limits

Ecology does not expect a permit holder will have to install additional treatment to comply with effluent limits to percolation systems. The only impact of effluent limits will be that permit holders 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 $16.10 per hour. Based on these assumptions, the annual labor cost is $837.

Total Costs

Tables 30 and 31 (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 30: Total Cost Estimate – Percolation System (All Waste Streams except Noncontact Cooling Water)

Total Cost Estimate -- Percolation System (All Waste Streams Except Noncontact Cooling Water)	
Requirement	**Cost estimate**
Sedimentation Device	$ 94 - 376
Ground Water Monitoring	$ 0 - 1,758
Effluent Limits	$ 837
TOTAL	**$ 931 - 2,971**

Table 31: Total Cost Estimate – Percolation System (Noncontact Cooling Water)

Total Cost Estimate -- Percolation System (Noncontact Cooling Water)	
Requirement	**Cost estimate**
Ground Water Monitoring	$ 0 - 1,758
Effluent Limits	$ 837
TOTAL	**$ 837 - 2,595**

3.2.6 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. Water quality standards

Sedimentation Device

The cost of a sedimentation device is estimated in Section 3.2.4. Sedimentation devices are not required for noncontact cooling water.

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 of complying with the water quality standards are not to be included in the cost estimate.

Total Costs

Table 32 (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.

Table 32: Total Cost Estimate – Surface Water

Total Cost Estimate -- Surface Water	
Requirement	**Cost estimate**
Sedimentation Device	$ 94 - 376
TOTAL	$ 94 - 376

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

3.3 Monitoring costs

Monitoring requirements are specific to the type of waste water treatment and disposal methods used by the permit holder. 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.

3.3.1 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

Businesses are required to monitor effluent quarterly during their first year of the general permit, and then may reduce the frequency in subsequent years. 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 33 and 34 show the cost estimates for each type of effluent monitoring for each TDM. The cost is the same for small and large businesses.

Table 33: Cost Estimate – Laboratory Costs for Effluent Monitoring

Cost Estimate – Laboratory Costs for Effluent Monitoring (All Waste streams Except 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
Cost Estimate – Laboratory Costs for Effluent Monitoring (Noncontact Cooling Water)		
POTW	$ 43	$ 111
Land application	$ 74	$ 192
Percolation system	$ 74	$ 192
Source: Cascade Analytical: Fresh Fruit Packer Permit 2016 Price list.		

Table 34: Cost Estimate – Reporting Costs for Effluent Monitoring

Cost Estimate – Reporting Costs for Effluent Monitoring			
Method	Hours	Frequency	Annualized Cost
Lined evaporative lagoon	0.5	Quarterly	$ 82
Dust abatement	1	Quarterly	$ 164
POTW	1	Quarterly	$ 164
Land application	1	Quarterly	$ 164
Percolation system	1	Quarterly	$ 164
Surface water	1	Monthly	$ 492
Surface water	1	Quarterly	$ 164

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

3.3.2 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 $16.10 per hour for this labor. Table 35 shows the cost estimates:

Table 35: Total Cost Estimate – Additional Monitoring

Total Cost Estimate -- Additional Monitoring				
Method	**Hours**	**Frequency**	**Duration**	**Annual Cost**
Lined Evaporative Lagoon				
In Season	0.5 hrs	1 / day	60 days	$ 483
Out of Season	0.5 hrs	1 / month	10 months	$ 81
Dust Abatement	0.5 hrs	1 / week	10 weeks	$ 81
POTW	0.5 hrs	1 / week	52 weeks	$ 419
Land Application	0.5 hrs	1 / day	365 days	$ 2,938
Percolation System	0.5 hrs	1 / week	52 weeks	$ 419
Surface Water	0.5 hrs	1 / week	52 weeks	$ 419

3.3.3 Monitoring of bypassed, upsets, etc.

Additional samples must be taken to characterize unusual discharges and conditions, including bypasses, treatment process upsets, and 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.

3.4 Recordkeeping costs

Components of the cost of recordkeeping include:

1. Records retention
2. Facility logbook

3.4.1 Records retention

The permit holder 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 provision is the cost of storing records. This cost is likely very low or close to zero.

3.4.2 Facility logbook

The permit holder 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 $16.10 per hour. Table 36 shows the cost estimates:

Table 36: Total Cost Estimate – Facility Logbook

Total Cost Estimate -- Facility Logbook		
Size	**Hours / Year**	**Annualized Cost**
Small	18	$ 290
Large	50	$ 805

3.5 Plan Requirements

3.5.1 Treatment/disposal operations method costs

All permit holders must write an Environmental Compliance Plan (ECP), one portion of which contains a 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 $40.98 per hour. This cost is incurred once per permit term. Table 37 shows 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 37: Total Cost Estimate – Treatment/Disposal Operations Method

Total Cost Estimate -- Treatment/Disposal Operations Method						
TDM	**Small Businesses**			**Large Businesses**		
	Hours	**Total Cost**	**Annualized Cost**	**Hours**	**Total Cost**	**Annualized Cost**
Lined Evaporative Lagoon	4	$ 164	$ 36	8	$ 328	$ 71
Dust Abatement	8	$ 328	$ 71	16	$ 656	$ 142
POTW	8	$ 328	$ 71	16	$ 656	$ 142
Land Application	8	$ 328	$ 71	16	$ 656	$ 142
Percolation System	8	$ 328	$ 71	16	$ 656	$ 142
Surface Water	8	$ 328	$ 71	16	$ 656	$ 142

3.5.2 Solid waste management system costs

As part of the ECP, most permit holders must write and retain a Solid Waste Management Method (SWMM). The SWMM is good for the life of the permit (5 years). Permit holders that only store 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 $40.98 per hour. Table 38 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 38: Total Cost Estimate – Solid Waste Management Method

Total Cost Estimate -- Solid Waste Management Method			
Size	**Hours**	**Cost**	**Annualized Cost**
Small	4	$ 164	$ 36
Large	8	$ 328	$ 71

3.5.3 Spill prevention method costs

As part of the ECP, most permit holders must write and retain a Spill Prevention Method (SPM). Permit holders that only store 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 $40.98. Table 39 (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 39: Total Cost Estimate – Spill Prevention Method

Total Cost Estimate -- Spill Prevention Method			
Size	**Hours**	**Total Cost**	**Annualized Cost**
Small	8	$ 328	$ 71
Large	16	$ 656	$ 142

3.6 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 fruit packers under the five scenarios.

Table 40: Scenario One Total Costs

Total Compliance Costs -- Scenario One		
Requirement	**Small**	**Large**
TREATMENT / DISPOSAL METHODS		
Land Application	$ 5,970 - 6,601	$ 11,847 - 19,095
Land Application / Dust Abatement (DPA)	$ 458 - 2,003	$ 529 - 2,074
Dust Abatement (Lignosulfonate)	$ 393	$ 464
Percolation System (Noncontact Cooling Water)	$ 837 - 2,595	$ 837 - 2,595
Lined Storage Lagoon	$ 3,788 - 4,968	$ 5,655 – 9,171
MONITORING		
Land Application	$ 2,201	$ 2,201
Land Application / Dust Abatement (DPA)	$ 4,007	$ 4,007
Dust Abatement (Lignosulfonate)	$ 1,805	$ 1,805
Percolation System (Noncontact Cooling Water)	$ 775	$ 775
Lined Storage Lagoon	$ 645	$ 645
RECORDKEEPING	$ 397	$ 1,019
PLAN REQUIREMENTS		
TDOM: Land Application	$ 71	$ 142
TDOM: Land Application / Dust Abatement (DPA)	$ 71	$ 142
TDOM: Dust Abatement (Lignosulfonate)	$ 71	$ 142
TDOM: Percolation System (Noncontact Cooling Water)	$ 71	$ 142
Solid Waste Management Method	$ 36	$ 71
Spill Prevention Method	$ 71	$ 142
ANNUALIZED TOTALS		
1A. With Dust Abatement (Lignosulfonate)	**$ 21,688 – 26,781**	**$ 30,568 – 44,635**
1B. Without Dust Abatement (Lignosulfonate)	**$ 19,469 – 24,583**	**$ 28,298 – 42,365**

Table 41: Scenario Two Total Costs

Total Compliance Costs -- Scenario Two		
Requirement	**Small**	**Large**
TREATMENT / DISPOSAL METHODS		
POTW	$ 0	$ 0
Land Application / Dust Abatement (DPA)	$ 458 - 2,003	$ 529 - 2,074
Dust Abatement (Lignosulfonate)	$ 393	$ 464
Percolation System (Noncontact Cooling Water)	$ 837 - 2,595	$ 837 - 2,595
Lined Storage Lagoon	$ 3,788 - 4,968	$ 5,655 - 9,171
MONITORING		
POTW	$ 1,070	$ 1,070
Land Application / Dust Abatement (DPA)	$ 4,007	$ 4,007
Dust Abatement (Lignosulfonate)	$ 1,805	$ 1,805
Percolation System (Noncontact Cooling Water)	$ 775	$ 775
Lined Storage Lagoon	$ 645	$ 645
RECORDKEEPING	$ 397	$ 1,019
PLAN REQUIREMENTS		
TDOM: Land Application	$ 71	$ 142
TDOM: Land Application / Dust Abatement (DPA)	$ 71	$ 142
TDOM: Dust Abatement (Lignosulfonate)	$ 71	$ 142
TDOM: Percolation System (Noncontact Cooling Water)	$ 71	$ 142
Solid Waste Management Method	$ 36	$ 71
Spill Prevention Method	$ 71	$ 142
ANNUALIZED TOTALS		
1A. With Dust Abatement (Lignosulfonate)	**$ 14,566 – 19,049**	**$ 17,590 – 24,409**
1B. Without Dust Abatement (Lignosulfonate)	**$ 12,367 – 16,851**	**$ 15,320 – 22,139**

Table 42: Scenario Three Total Costs

Total Compliance Costs -- Scenario Three		
Requirement	**Small**	**Large**
TREATMENT / DISPOSAL METHODS		
Percolation System	$ 931 - 2,971	$ 931 - 2,971
Land Application / Dust Abatement (DPA)	$ 458 - 2,003	$ 529 - 2,074
Dust Abatement (Lignosulfonate)	$ 393	$ 464
Percolation System (Noncontact Cooling Water)	$ 837 - 2,595	$ 837 - 2,595
Lined Storage Lagoon	$ 3,788 - 4,968	$ 5,655 - 9,171
MONITORING		
Percolation System	$ 1,151	$ 1,151
Land Application / Dust Abatement (DPA)	$ 4,007	$ 4,007
Dust Abatement (Lignosulfonate)	$ 1,805	$ 1,805
Percolation System (Noncontact Cooling Water)	$ 775	$ 775
Lined Storage Lagoon	$ 645	$ 645
RECORDKEEPING	$ 397	$ 1,019
PLAN REQUIREMENTS		
TDOM: Land Application	$ 71	$ 142
TDOM: Land Application / Dust Abatement (DPA)	$ 71	$ 142
TDOM: Dust Abatement (Lignosulfonate)	$ 71	$ 142
TDOM: Percolation System (Noncontact Cooling Water)	$ 71	$ 142
Solid Waste Management Method	$ 36	$ 71
Spill Prevention Method	$ 71	$ 142
ANNUALIZED TOTALS		
1A. With Dust Abatement (Lignosulfonate)	**$ 15,578 – 22,101**	**$ 18,602 – 27,461**
1B. Without Dust Abatement (Lignosulfonate)	**$ 13,379 – 19,902**	**$ 16,332 – 25,191**

Table 43: Scenario Four Total Costs

Total Compliance Costs -- Scenario Four		
Requirement	**Small**	**Large**
TREATMENT / DISPOSAL METHODS		
Land Application	$ 5,970 - 6,601	$ 11,847 - 19,095
Land Application / Dust Abatement (DPA)	$ 458 - 2,003	$ 529 - 2,074
Lined Evaporative Lagoon	$ 3,788 - 4,968	$ 5,655 - 9,171
Percolation System (Noncontact Cooling Water)	$ 837 - 2,595	$ 837 - 2,595
MONITORING		
Percolation System	$ 1,151	$ 1,151
Land Application / Dust Abatement (DPA)	$ 4,007	$ 4,007
Dust Abatement (Lignosulfonate)	$ 1,805	$ 1,805
Percolation System (Noncontact Cooling Water)	$ 775	$ 775
Lined Storage Lagoon	$ 645	$ 645
RECORDKEEPING	$ 397	$ 1,019
PLAN REQUIREMENTS		
TDOM: Land Application	$ 71	$ 142
TDOM: Land Application / Dust Abatement (DPA)	$ 71	$ 142
TDOM: Dust Abatement (Lignosulfonate)	$ 71	$ 142
TDOM: Percolation System (Noncontact Cooling Water)	$ 71	$ 142
Solid Waste Management Method	$ 36	$ 71
Spill Prevention Method	$ 71	$ 142
ANNUALIZED TOTALS	**$ 20,244 – 25,338**	**$ 29,053 – 43,120**

Table 44: Scenario Five Total Costs

Total Compliance Costs -- Scenario Five		
Requirement	**Small**	**Large**
TREATMENT / DISPOSAL METHODS		
Percolation System (Noncontact Cooling Water)	$837 - 2,595	$837 - 2,595
MONITORING		
Percolation System (Noncontact Cooling Water)	$ 775	$ 775
RECORDKEEPING	$ 397	$ 1,019
PLAN REQUIREMENTS		
TDOM: Percolation System (Noncontact Cooling Water)	$ 71	$ 142
Solid Waste Management Method	$ 36	$ 71
Spill Prevention Method	$ 71	$ 142
ANNUALIZED TOTALS	**$ 2,187 – 3,944**	**$ 2,986 – 4,744**

Chapter 4: Economic Impact Analysis Ratios and Conclusions

The EIA compares the costs of compliance for small and large businesses to determine whether the rule disproportionately impacts small businesses. This is the fundamental requirement that the EIA satisfies.

The cost comparison compares proportionate compliance costs for small businesses and large businesses. With few exceptions, absolute compliance costs will be greater for large businesses than for small. Therefore, costs are normalized, to make the comparison valid. Any one of the following three ratios may be used to compare costs:

1. Cost per employee.
2. Cost per hour of labor.
3. Cost per one hundred dollars of sales.

Ecology used cost-to-sales ratio as the measure of proportionate impact. It is an approximate estimate of the percentage rise in costs caused by the general permit. This is likely to be how the permit holder looks at compliance costs.

To calculate the ratio, Ecology divided annualized compliance cost by median annual sales. If the compliance cost ratio is higher for small businesses than it is for large businesses, then small businesses are disproportionately impacted by the general permit.

Table 45 (below) shows total annual compliance costs for small and large fresh fruit packers:

Table 45: Total Costs for Small and Large Businesses by Cost Scenario

Total Costs for Small and Large Businesses by Cost Scenario		
Scenario	**Small Businesses**	**Large Businesses**
1A 1B	$ 21,688 – 26,781 $ 19,469 – 24,583	$ 30,568 – 44,635 $ 28,298 – 42,365
2A 2B	$ 14,566 – 19,049 $ 12,367 – 16,851	$ 17,590 – 24,409 $ 15,320 – 22,139
3A 3B	$ 15,578 – 22,101 $ 13,379 – 19,902	$ 18,602 – 27,461 $ 16,332 – 25,191
4	$ 20,244 – 25,338	$ 29,053 – 43,120
5	$ 2,187 – 3,944	$ 2,986 – 4,744

Table 46 (below) shows the range of cost-to-sales ratios for fruit packers under the five cost scenarios:

Table 46: Total Cost-to-Sales Ratios for Small and Large Businesses by Cost Scenario

Cost-to-Sales Ratios for Small and Large Businesses by Cost Scenario (Annualized Cost per $100 of Sales)						
Scenario	**Small Businesses**		**Large Businesses**		**Percentage Difference in Cost-to-Sales Ratios**	
	Low	**High**	**Low**	**High**	**Low**	**High**
1A	$ 0.12	$ 0.15	$ 0.04	$ 0.05	-71.0 %	-65.7 %
1B	$ 0.11	$ 0.14	$ 0.03	$ 0.05	-70.1 %	-64.6 %
2A	$ 0.08	$ 0.11	$ 0.02	$ 0.03	-75.2 %	-73.7 %
2B	$ 0.07	$ 0.10	$ 0.02	$ 0.03	-74.5 %	-73.0 %
3A	$ 0.09	$ 0.13	$ 0.02	$ 0.03	-75.4 %	-74.5 %
3B	$ 0.08	$ 0.11	$ 0.02	$ 0.03	-74.9 %	-74.0 %
4	$ 0.11	$ 0.14	$ 0.03	$ 0.05	-70.5 %	-65.0 %
5	$ 0.012	$ 0.022	$ 0.003	$ 0.006	-71.9 %	-75.3 %

The cost-to-sales ratios fall as sales rise. 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.

Ecology determined **the conclusion is independent of the particular cost scenario** because, while sales differ dramatically between the typical small and typical large business, compliance costs differ relatively less. Therefore, irrespective of the cost scenario, small businesses will always be disproportionately impacted, relative to large businesses.

Chapter 5: Mitigation of Disproportionate Impacts

If the compliance cost ratio is higher for small businesses than for large businesses, then small businesses are disproportionately impacted. Ecology concluded in Chapter 4 that this is the case for the reissued Wastewater Discharge General Permit for the Fresh Fruit Packing Industry. The general permit rule (WAC 173-226-120) requires that disproportionate economic impacts of general permits on small businesses be reduced, when it is both legal and feasible to do so. Legality and feasibility are determined by the legal context of existing state and federal rules, such as the State Water Pollution Control Act (Chapter 90.48 RCW) and the federal Clean Water Act.

Mitigation involves one or more of the following:

- 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.

Cost impacts on small businesses are reduced by modifying the conditions of the general permit.

Ecology took the following steps in this general permit to mitigate its impact on small businesses:

- Compliance schedules can be used to delay and spread out the costs of complying with the general permit.
- Permit holders that only store fruit (no drenching or packing) will not have to write the sections of the ECP that deal with their SPM or SWMM. Most such permit holders 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 permit holders.
- Permit fees for small businesses covered by the fruit packing general permit are decreased in three ways:
    1. Holders of general permits receive a 30 percent discount on the standard fee.
    2. New applicants for general permit 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.

These mitigation measures are described below:

5.1 Necessity to comply with state and federal laws and rules

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 permits must contain effluent limits that are at least as strict as federal effluent standards, to mitigate their impact on small business.

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 permit holders to violate. Thus, compliance costs based on the AKART requirement also cannot be mitigated.

Ecology also places conditions in general permits to ensure discharges do not violate the state's:

- 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)
- Wastewater Discharge Permit Fees (Chapter 173-224 WAC)

These conditions are legal requirements that Ecology cannot allow permit holders 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.

5.2 Impact of mitigation on effectiveness of general permit in controlling water pollution

The general permit rule 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 fruit packers cannot be mitigated significantly. Because many fruit packers are small businesses, the economic impact of the general permit on small packers cannot be significantly reduced without reducing the effectiveness of the 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 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.

5.3 Mitigation

5.3.1 Compliance schedules

Compliance schedules can be used to delay and spread out the costs of complying with the general permit. The permit holder 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 fruit packers.

5.3.2 Environmental compliance plan

Permit holders 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. Such permit holders typically do not have the potential for spills, and so not generate solid waste.

5.3.3 Monitoring requirements

The costs of effluent monitoring have been reduced for some permit holders. In particular, permit holders 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.

5.3.4 Permit fees

Fresh fruit packing general permit holders must pay permit fees under Chapter 173-224 WAC, Wastewater Discharge Permit Fees.

Fees for fresh fruit packers that pack fruit depend on the median number of field bins processed per year, during the latest three years. Fees for fresh fruit packers that only store 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 fruit packers that pack fruit, if that fee is lower.

Presently, permit fees for small businesses covered by the fruit packing general permit are decreased in three ways:

1. Holders of general permits receive a 30 percent discount from the standard fee.
2. Applicants for general permits who currently hold individual permits are not required to pay application fees.
3. Small businesses 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 the greater of: 50 percent of the permit fee; or $250. Because small businesses tend to be small fruit packers (produce fewer bins and have lower sales at the median than large businesses), some small fruit packers should be able to qualify for fee reduction.