Compliance Nooksack River Watershed Audit Report

ENVIRONMENTAL MANAGEMENT ACT
2018

BRITISH COLUMBIA

Ministry of Environment and Climate Change Strategy

Executive Summary

The Nooksack River Watershed compliance audit was undertaken to locate and review agriculture and compost facilities operating in the Nooksack River Watershed area and assess compliance with regulatory requirements under the *Environmental Management Act* (EMA).

There are currently 15 compost and agriculture facilities registered or authorized to discharge waste in the Nooksack River Watershed under EMA, all of which were inspected in this audit. An additional 33 unregistered facilities were identified and inspected, bringing the total number of inspections in this audit to 48. The audit focused on the solid and liquid waste management criteria outlined in the Agricultural Waste Control Regulation (AWCR), the Organic Matter Recycling Regulation (OMRR), the Mushroom Compost Facilities Regulation (MCFR), the Land-based Finfish Waste Control Regulation (LFWCR), and authorizations under EMA. Inspections were completed between October 2017 and March 2018 in order to capture the most challenging enviromental conditions for waste management in a region that receives over 600 mm of rainfall during this period.

The objective of this audit was to determine compliance rates in the agriculture and composting sector in the Nooksack River Watershed, and provide recommendations to improve overall compliance within the sector. This audit will also help to inform decisions made by the Nooksack River Transboundary Technical Collaboration Group[1] and guide long-term compliance efforts in the agricultural and compost sectors beyond the Nooksack River Watershed.

Data collected during this audit shows that 58 percent of agricultural and compost operations were in compliance with their respective regulation or authorization; however, a number of these operations did not store, produce or use manure. When data from those operations were removed, compliance dropped to 44 percent. Additionally, agricultural sectors differed greatly in their performance. 100 percent of poultry, blueberry and greenhouse operations were in compliance with their requirements and zero percent of mushroom, mushroom compost, and compost operations were in compliance. 67 percent of fur bearing animal facilities were in compliance, however only 30 percent of equestrian facilities were in compliance. Only two facilities each of the pig, meat by-product, land based fish farms, dairy, and cattle industries were inspected and had varying compliance rates.

The greatest occurrences of non-compliance fell under the AWCR and EMA and were "escape of agricultural waste that causes pollution from storage facilities" (six occurrences), "uncovered field stored agricultural waste between October 1 and April 1" (six occurrences), as well as unauthorized discharges under EMA (21 occurrences from six different facilities).

The following recommendations are suggested:

COMPLIANCE VERIFICATION AND PROMOTION

1. Continue inspections in the Nooksack River Watershed but focus on the following sectors: compost, dairy, equestrian, mushroom compost, mushroom growing, and organic blueberry operations. Inspections should take place during October 1 to April 1 or extended periods of high rainfall so as to capture the most challenging waste management conditions. Inspections should also take place during the manure application season.
2. Follow-up on completed inspections of non-compliant operations.
3. Provide information to agricultural and compost facilities to encourage compliance and promote awareness of the AWCR and OMRR. Examples include Ministry of Environment and Climate Change Strategy (ENV) reference documents: 'How to stay in compliance', 'What to expect from an inspection' and 'What to do if you're out of compliance'. Documents could be distributed through relevant industry associations such as the Horse Council of B.C.

1 The Nooksack River Transboundary Technical Collaboration Group is working on a three-year work plan involving communication, compliance, and monitoring actions to reduce fecal coliform bacteria in the Nooksack River Watershed.

4. Ensure future permits for agricultural and composting operations in the Nooksack River Watershed include limits for fecal coliform bacteria (FCB) and/or E. coli.
5. Participate in the Nooksack River Transboundary Technical Collaboration Group, provide updates on compliance activities and receiving environment monitoring, and assist in locating and remediating sources of FCB.
6. Expand ENV's current receiving environment monitoring program to include weekly samples during the rainy season and focus on accurate Bacterial Source Tracking analyses. This will improve identification of FCB sources (areas and sites), determine which livestock or wildlife contribute most to the fecal load in the Nooksack River Watershed, and help identify sectors for targeted compliance work.
7. Conduct agricultural and compost audits beyond this watershed and throughout the province. Inspections should take place during October 1 to April 1 so as to capture the most challenging waste management conditions.

FOR POLICY AND GOVERNMENT INITIATIVES

8. Update AWCR and OMRR to include registration requirements for all agricultural and compost operations.
9. Increase funding for Environmental Farm Plan Program and promote this initiative to agriculture operations to improve waste management practices.
10. Engage with waste removal contractors and promote best management practices. Waste removal contractors are not a prescribed industry under EMA, however they are a key player in the movement and disposal of agricultural waste in the Nooksack River Watershed.
11. Research whether tracking of agricultural waste should be regulated. Regulations could ensure waste removal operations adhere to waste management principles.

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Introduction

The Nooksack River is located south of the United States (U.S.) - Canada Border in the State of Washington and discharges primarily into Bellingham Bay through a wetland system. The watershed for this river spans both the United States and Canada (Figure 1: Nooksack River Watershed), and in recent years there has been a significant increase in urban and agricultural development throughout the watershed. This has led to an overall decline in water quality and ecosystem health in this area. At the mouth of the Nooksack River is the Lummi Indian Reservation. The Lummi Nation, and neighbouring Nooksack nations, maintain usual and accustomed fishing and shellfish harvesting rights within the basin. Shellfish harvesting by the Lummi Nation in the Nooksack estuary has experienced closures since 1998 due to high fecal coliform bacteria (FCB) levels (Portage Bay Shellfish Protection District Advisory Committee 2014).

Under the Boundary Waters Treaty, signed in 1909, Canada and the United States agreed that shared waters shall not be polluted on either side of the border, or cause injury of health or property on the other side. The Pepin, Fishtrap and Bertrand creeks of South Abbotsford, British Columbia (B.C.), are all tributaries of the Nooksack River. The U.S. Department of Agriculture has collected site specific water quality data showing that these tributaries carry a disproportionately high fecal load to the Nooksack River (State of Washington Department of Agriculture 2018a and 2018b).

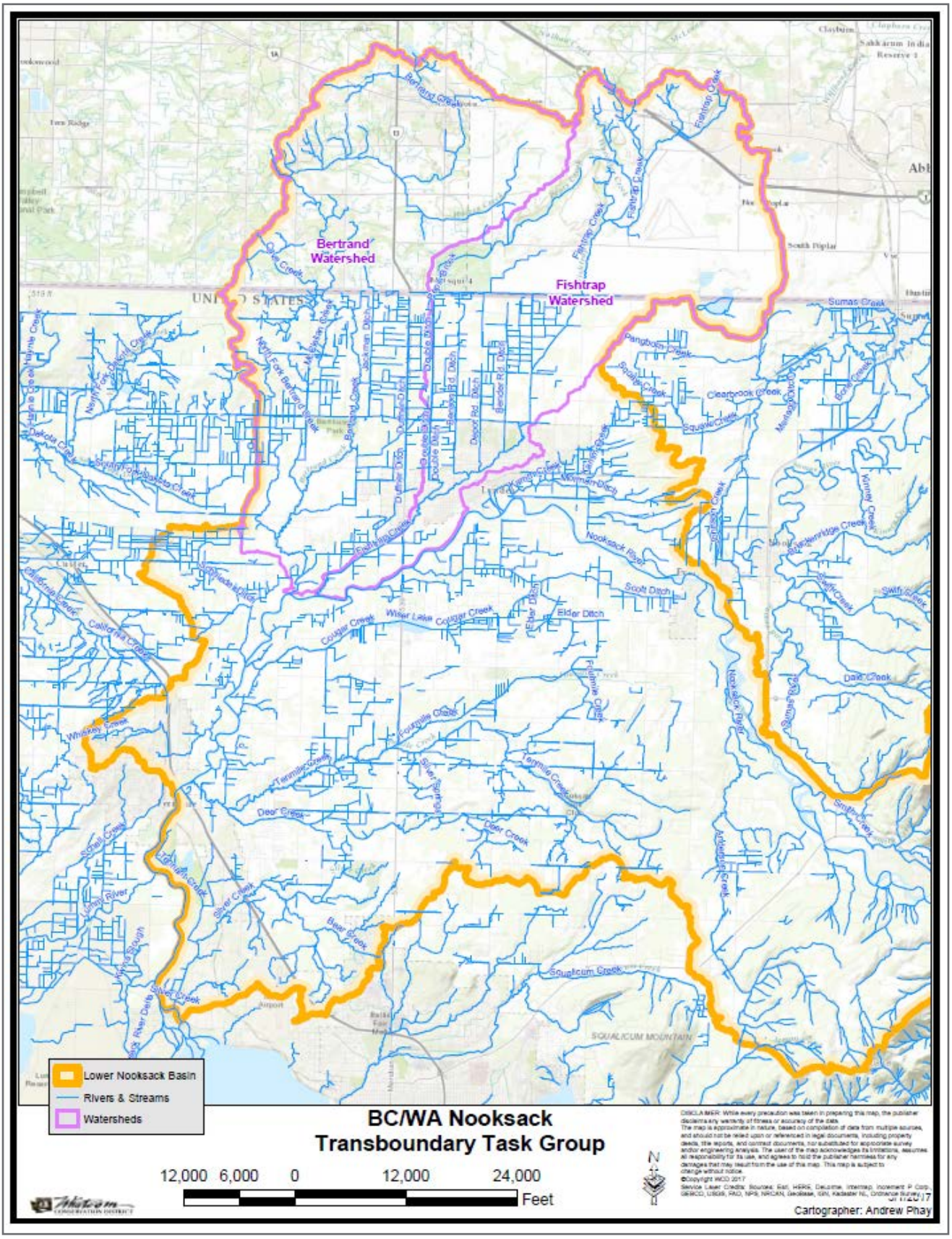
Environmental management of agricultural activity in the Nooksack River Watershed is undertaken at municipal, provincial, and federal levels. The B.C. Ministry of Environment and Climate Change Strategy (ENV), through effluent permits authorized under the *Environmental Management Act* (EMA), as well as associated regulations including the Agricultural Waste Control Regulation (AWCR), Organic Matter Recycling Regulation (OMRR), Land-based Finfish Waste Control Regulation (LFWCR), and Mushroom Compost Facilities Regulation (MCFR), regulates waste by specifying waste discharge standards, terms and conditions. The Waste Discharge Regulation (WDR) defines what industries and operations require discharge authorization under EMA.

There are currently 15 known agricultural and compost operations that are registered under a regulation or hold an authorization to discharge within the Nooksack River Watershed. The types of industries vary and include composting facilities, greenhouses, finfish operations and mushroom compost facilities. Each effluent or refuse discharge has the potential to release harmful contaminants to the environment which can significantly impact the health of aquatic ecosystems. However, these 15 facilities represent just a fraction of the total agricultural operations in the area. Unlike effluent permits, the LFWCR, MCFR, AWCR and OMRR do not require all facilities to formally register with ENV. As a result, there are currently an unknown number of farms and compost facilities operating in the Nooksack River Watershed that are subject to these regulations.

This audit evaluated 48 agricultural and compost operations located within the Nooksack River Watershed to determine their level of compliance with EMA, LFWCR, MCFR, AWCR, OMRR, and effluent permits. Operations were divided into the following sectors: equestrian, compost, mushroom and mushroom compost, blueberry, greenhouse, poultry, fur bearing animals, and other (for sectors where just one operation was inspected). The objectives of the audit were to:

1. Determine each operation's compliance with its permit or applicable regulation and show the overall compliance rate for the sector;
2. Determine the compliance rate for each sector;
3. Provide information and support to the Nooksack River Transboundary Water Quality Task Group; and
4. Provide recommendations to improve regulatory compliance both within the Nooksack River Watershed as well as the agricultural sector as a whole.

FIGURE 1 – NOOKSACK RIVER WATERSHED



Background

Virtually all water-borne diseases result from poor waste management, treatment and disposal practices (B.C. Ministry of Environment and Climate Change Strategy, 2001). The use of indicator organisms is an efficient and cost-effective method for determining contamination of waterways. Common indicators include fecal coliform bacteria (FCB) and Escherichia coli (*E. coli*).

The Canadian Food Inspection Agency stipulates the following FCB guidelines for shellfish harvest (Canadian Food Inspection Agency 2018):

- ≤ 14/100mL: median
- ≤ 43/100mL: no more than 10 percent of samples

B.C. Water Quality Guidelines and Objectives (2017) have moved away from FCB guidelines and instead stipulate following *E. coli* guidelines for primary contact (wading, swimming, and other recreational activities):

- ≤ 200/100mL geomean
- ≤ 400/100mL maximum

In December 2016, representatives from ENV, Environment and Climate Change Canada (ECCC), State of Washington, and the U.S. Environmental Protection Agency formed the Nooksack River Transboundary Water Quality Task Group (WQTG) in response to elevated concentrations of FCB in the Nooksack River and Pepin, Fishtrap, and Bertrand Creek tributaries. Concentrations of FCB in these watercourses frequently exceed 200/100mL, and can be in excess of 10,000/100mL (State of Washington Department of Agriculture 2018a and 2018b). The purpose of this group was to develop a common understanding of the following:

- Current water quality issues and data;
- Conditions related to FCB in transboundary waters and tributaries to the Nooksack River and the downstream Portage Bay in the State of Washington;
- Legislative structures, policies and best practices; and
- Opportunities to reduce preventable sources of FCB pollution in each jurisdiction.

As a result of recommendations from the WQTG, ENV biologists implemented ongoing monthly fecal sampling and a Bacterial Source Tracking program at thirteen locations throughout the B.C. portion of the watershed. This program was initiated in June 2017 and helped identify areas of concern and sites for compliance inspections.

Based on compliance and monitoring efforts undertaken in B.C. and the State of Washington by the WQTG in the past 2 years, it has been proposed that a three-year (2018-2021) Nooksack River Transboundary Technical Collaboration Group (Nooksack TTCG) be formed to replace the WQTG. The aim of the Nooksack TTCG's three year work plan is to focus on communication, compliance, and monitoring related to:

- Data and information sharing;
- Coordinated sampling methodologies and plans;
- Education and compliance plans and activities; and
- Outreach and technical assistance for landowners.

Regulatory Context

Effective regulations ensure a safe and healthy environment for British Columbians, sustainable economic development, and clear and predictable decisions for the public and business community.

MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE STRATEGY (ENV) MANDATE

ENV is responsible for the protection, management and conservation of B.C.'s water, land, air and living resources. In order to fulfil this mandate, ENV establishes and administers a broad suite of regulatory requirements. Table 1 presents an overview of the legislation that is relevant to this audit.

TABLE 1 – REGULATORY CONTEXT

***Environmental Management Act* (EMA)**	The *Environmental Management Act* (EMA) is the key ministry statute governing environmental protection and management in B.C. EMA regulates industrial and municipal waste discharges, pollution, air quality, hazardous waste and contaminated site remediation. It provides powers and authorities for ministry staff to verify compliance, to prevent and correct detrimental environmental impacts, and to take enforcement action and respond to environmental emergencies.
Waste Discharge Regulation (WDR)	The Waste Discharge Regulation (WDR) defines what industries, activities and operations require authorizations to discharge or release waste to the air, water, and land under EMA.
Agricultural Waste Control Regulation (AWCR)	The Agricultural Waste Control Regulation (AWCR) regulates agricultural operations and activities carried out on farms including the production or keeping of livestock, poultry, farmed game, fur bearing animals, crops, grain, vegetables, milk, eggs, honey, mushrooms, horticultural products, tree fruits, and berries. The regulation also covers the operation of machinery and equipment for agricultural waste management or application of fertilizers and soil conditioners. The AWCR prescribes environmentally sound practices for using, storing and managing agricultural wastes and by-products, such as manure and composted materials.
Organic Matter Recycling Regulation (OMRR)	The Organic Matter Recycling Regulation (OMRR) governs the production, quality and land application of certain types of organic matter. It provides clear guidance for local governments, as well as compost and biosolids producers, on how to use organic material while protecting soil quality and drinking water sources.
Land-based Finfish Waste Control Regulation (LFWCR)	The Land-based Finfish Waste Control Regulation regulates the discharge of wastes from land-based aquaculture operations.
Mushroom Compost Facilities Regulation (MCFR)	The Mushroom Compost Facility Regulation (MCFR) governs facilities producing mushroom growing substrate using a composting process. The MCFR regulates discharges into the environment of emissions, solid wastes and liquid wastes (also termed goody water) from these facilities.

Audit Approach

There are currently 15 known agricultural and compost operations that are registered under a regulation or hold an authorization to discharge within the Nooksack River Watershed. The majority of these are greenhouses registered under the AWCR. Also included are mushroom compost facilities, compost facilities, and one facility registered under the LFWCR. Each of these operations received an on-site inspection, and for any authorization with reporting requirements, a desktop analysis was completed for submitted 2016 and 2017 monitoring data.

An additional 33 agricultural and compost facilities operating in and nearby the Nooksack River Watershed were also inspected. These sites were identified using the following techniques:

- Receiving environment monitoring data collected by ENV biologists identified watercourses with high FCB concentrations. Agricultural or compost sites that were located closest to these locations were prioritised for inspection.
- Google Earth was used to identify structures associated with different agricultural sectors such as oval-shaped horse pens, enclosed vented barns for poultry, and effluent ponds.
- Google searches for equestrian facilities, mushroom farms, and other operations were performed.
- Complaints regarding agricultural or compost operations located in the Nooksack River Watershed submitted to the environmental complaints mailbox EnvironmentalComplaints@gov.bc.ca.
- Additional operations were identified while conducting on-site inspections of nearby facilities or while collecting receiving environment monitoring data.
- ECCC is also focusing compliance efforts on the Nooksack River Watershed under the *Fisheries Act*. ECCC was consulted throughout the inspection planning process to ensure minimal inspection crossover for compliant operations and to identify sites that required inspections under both federal and provincial legislation.

In many cases, the operation type and sector was unknown or uncertain until ENV Environmental Protection Officers (EPOs) arrived on-site for the inspection.

Office reviews and on-site inspections were completed by ENV EPOs. Compliance points within the permit or regulation for each agricultural and compost operation were assessed, and a compliance response was determined based on the outcome of each inspection. Each operation that was assessed during this audit received an inspection record detailing the determination for each compliance point and final compliance response. This inspection record was then issued to the operation's contact person(s).

On-site inspections took place from October 2017 to March 2018. This timeframe was chosen in order to capture the rainy season in the Fraser Valley, which receives upwards of 600 mm of rain annually from October 1 to April 1 and presents the greatest risk for environmental impact due to uncovered agricultural waste and compost. This timeframe was also chosen with the intent of including manure application in blueberry operations, which typically occurs annually between mid-February to mid-April.

LIMITATIONS

While there are a number of authorized non-agricultural facilities within the Nooksack River Watershed that operate under various regulations and codes of practice as well as other activities regulated by other agencies, this compliance audit was limited to agricultural and compost operations prescribed under Schedule 1 or 2 of the Waste Discharge Regulation (WDR). This limits the ability of this report to speak to all potential FCB sources in the watershed.

COMPLIANCE DETERMINATIONS

In order to determine whether each operation was in compliance with their permit or applicable regulation, one of four compliance determinations was assigned for each compliance point assessed within the permit

or regulation. The four compliance determinations are defined as:

1. In – Operations determined to be 'In' compliance met the requirements of the compliance point.
2. Out – an 'Out' of compliance determination was given to operations that do not meet the requirements of the compliance point.
3. Not Determined – Assigned to operations in which compliance points were applicable, but were not able to be assessed due to missing information.
4. Not Applicable – Assigned to operations to which compliance points did not apply.

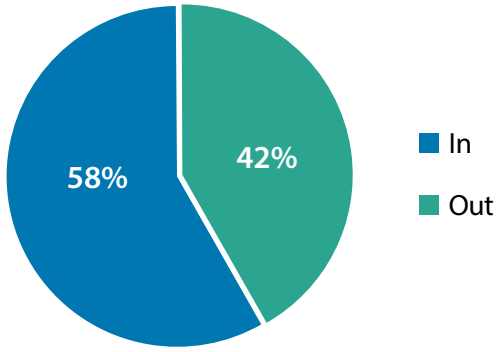
COMPLIANCE/ENFORCEMENT RESPONSE DETERMINATIONS

A final decision was made on what was the appropriate compliance/enforcement response for each operation. Decisions were based on the compliance determinations, EPO's professional judgement, and a consideration of the Non-Compliance Decision Matrix found in ENV Compliance and Enforcement Policy and Procedure, Version 4, 2018 (Appendix 4). The compliance determinations issued in this audit were a Notice, Advisory, or Warning.

RESULTS

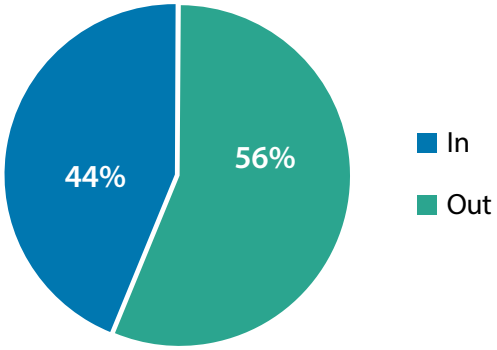
Compliance was assessed by each facility's demonstrated ability to meet the requirements outlined in each regulation or authorization. Overall, 58 percent of agriculture and composting facilities were in compliance with their respective regulation or authorization requirements (Figure 2).

FIGURE 2 – OVERALL COMPLIANCE OF ALL AGRICULTURE AND COMPOSTING FACILITIES



Twelve of the compliant operations were greenhouses. These greenhouses did not use or produce manure, and are therefore not considered to be relevant for the purpose of this audit as they did not have the potential to contribute FCB to the audit's watershed. In addition to this, there were three blueberry operations that did not use or produce manure, and one land-based fish farm operation that had registered with ENV in 2009 but on-site inspection found that this site was not developed or operating. Removal of all operations that did not use, produce, or store manure puts overall compliance much lower, at 44 percent (Figure 3).

FIGURE 3 – OVERALL COMPLIANCE FOR OPERATIONS THAT PRODUCE, USE OR STORE MANURE



BLUEBERRY SECTOR (4 OPERATIONS)

Blueberries are the most common berry grown in the Nooksack River Watershed. Based on conversations with blueberry operation staff, it was found that manure is mostly used by organic producers, and that chicken manure is the most common type of manure used due to its low moisture content. The provincial Berries Production Guide (B.C. Ministry of Agriculture, 2012) advises that manure should be applied to berry crops between mid-February to mid-April (Figure 4). In addition, Canadian organic standards state that operations that use non-composted manure must ensure that application is timed to occur at a minimum of 120 days prior to harvest (Government of Canada, 2018). This audit inspected four blueberry farms during the week of March 19 23, 2018. 100 percent of the blueberry sector was found to be in compliance, however, it should be noted that only one of the four farms used manure as a fertilizer and that no manure was on-site during any of the four inspections. The farm that did use manure was an organic blueberry operation.

FIGURE 4 – EXAMPLE OF MACHINERY USED TO APPLY FERTILIZER AND MANURE TO BASE OF BLUEBERRY PLANTS

COMPOST SECTOR (3 OPERATIONS)

Compost facilities receive much of the agricultural waste produced in this region; many equestrian facilities visited confirmed that their waste is composted at one of these sites. Three compost facilities were inspected as part of this audit; one was inspected under an existing ENV effluent permit, one was inspected in response to a complaint, and one was identified when inspecting a neighbouring agricultural facility and inspected immediately after. 100 percent of the compost sector was found to be out of compliance.

FIGURE 5 – EXAMPLE WATER TREATMENT SYSTEM FOR COMPOST EFFLUENT

The non-compliances for the effluent permits and EMA were as follows:

- Exceedance of total suspended solids (TSS) permit limit
- Exceedance of total ammonia nitrogen permit limit
- Exceedance of the total kjeldahl nitrogen (TKN) permit limit
- Exceedance of biological oxygen demand (BOD) permit limit
- Failure to report as required by the permit
- Failure to measure flow as required by the permit
- Effluent sampling found concentrations of *E. coli* to be in excess of 120,000 /100mL, which is more than 1500 times the B.C. Water Quality Guidelines and Objectives (2017) for primary contact recreation. Samples collected upstream of the discharge found *E. coli* concentrations of 250 /100ml. This was found to be a non-compliance with EMA 6(4): introduction of waste that causes pollution.

FIGURE 6 – EXAMPLE RUNOFF FROM A COMPOST OPERATION

In response to a complaint, one facility denied that any composting was taking place as they imported manure from various waste streams and mixed this to produce a product sold for landscaping; therefore, compliance was assessed against the AWCR:

- Storage of waste from other farms without being used on-site (Section 4)
- Storage of waste outside of storage facility (Section 5(a))
- Discharge of agricultural waste directly to groundwater (Section 11)

The final compost facility received waste from a nearby agricultural operation and composted this for sale as a landscaping product; therefore compliance was assessed against OMRR and EMA and the non-compliances were as follows:

- Failure to notify ENV prior to beginning operation (OMRR Section 25(1)(a))
- Entire operation located on a permeable surface (OMRR Section 26(2)(a))
- Entire operation was uncovered and did not have a prepared surface to prevent surface water accumulation around base of compost and run-off water from entering receiving, storage, processing and curing areas (OMRR Sections 26(2)(b)(i) and (ii))
- No leachate collection system (OMRR Section 26(2)(c))
- Discharge of leachate to the environment (OMRR Section 26(3))
- Five unauthorized discharges (EMA Section 6(3))

EQUESTRIAN SECTOR (10 OPERATIONS)

Along with greenhouses, equestrian facilities were a heavy focus of this audit as the oval-shaped horse training pens are easily recognised in Google Earth. A total of 10 facilities were visited, 70 percent of these were out of compliance with the AWCR.

Facilities stored agricultural waste in either a storage facility prior to application as a fertilizer or removal by a contractor, or as field storage prior to application as a fertilizer. Non-compliances with the AWCR were as follows:

- Insufficient capacity of storage facility for volume of waste stored (Section 6 (a)(i) and (ii))
- Escape of agricultural waste from storage facility (Section 6 (b))
- Uncovered field storage during October 1 to April 1 (Section 9)
- Field storage located less than 30m from watercourse (Section 8 (2)(b))

FIGURE 7 – EXAMPLE OF AN EQUESTRIAN WASTE STORAGE FACILITY WITH INSUFFICIENT CAPACITY AND ESCAPE OF AGRICULTURAL WASTE

FIGURE 8 – EXAMPLE OF UNCOVERED FIELD STORED EQUESTRIAN WASTE

Three facilities were found to be in compliance with the AWCR, in two cases the waste was stored in a storage facility that had sufficient capacity and prevented the escape of agricultural waste (Figure 9). In one case all waste was loaded directly into a mobile storage unit that was collected by a contractor when full (Figure 10).

FIGURE 9 – EXAMPLE OF EQUESTRIAN WASTE STORAGE FACILITY IN COMPLIANCE WITH AWCR

FIGURE 10 – EXAMPLE OF EQUESTRIAN WASTE MOBILE STORAGE UNIT IN COMPLIANCE WITH AWCR

Equestrian owners expressed frustration at costs associated with upgrading waste storage facilities and covering field stored agricultural waste.

GREENHOUSE SECTOR (12 OPERATIONS)

Greenhouses are the only operations consistently registered under the AWCR, due to registration requirements associated with heaters and boilers. Therefore they were used as a starting point for this audit. While some non-compliances were identified during these inspections, all were related to unregistered boilers and air emissions and were therefore not included in the audit. None of the greenhouses visited produced or used manure-based waste, and all waste and agricultural products were stored 100 percent in compliance with the AWCR.

FUR BEARING ANIMAL SECTOR (3 OPERATIONS)

Fur bearing animals generally include fox, mink, chinchilla and nutria. Mink operations were the only facilities inspected during this audit, and all mink farms in B.C. are located in the Fraser Valley (B.C. Ministry of Agriculture, 2014a). Mink eat a high-protein diet comprised of products from fish and poultry processors that would otherwise be disposed of as waste. Manure accumulates under the pens and the AWCR allows this waste to be stored up to nine months. All operations then move this waste to a storage facility for composting, removal, and/or land application. Another significant waste stream associated with these operations is mortalities, which may be disposed of on-site or removed by a contractor.

On-site disposal is comprised of either composting or burial. Three operations were inspected as part of this audit, one was found to be out of compliance.

FIGURE 11 – EXAMPLE OF A MINK WASTE STORAGE FACILITY IN COMPLIANCE WITH AWCR

Non-compliances with the AWCR and EMA were as follows:

- Insufficient capacity for agricultural waste in a storage facility (AWCR Section 6(a))
- Field stored agricultural waste did not have required berms to prevent escape of agricultural waste that causes pollution (AWCR Section 8(3))
- Uncovered field storage during October 1 to April 1 (AWCR Section 9)
- Application of agricultural waste to land resulting in runoff or escape of agricultural waste polluting a watercourse or groundwater (AWCR Section 13)
- Four unauthorized discharges (EMA Section 6(3)). Samples from two of these discharges found FCB concentrations to 33/100mL and 49/100 mL each.

FIGURE 12 – EXAMPLE OF MINK WASTE STORAGE FACILITY OUT OF COMPLIANCE WITH AWCR

MUSHROOM AND MUSHROOM COMPOST SECTOR (4 OPERATIONS)

B.C. is the second largest mushroom producing province in Canada, and the majority of the province's white and brown mushrooms are grown in the Fraser Valley (B.C. Ministry of Agriculutre, 2014b). Mushrooms are grown in a tiered bed system inside insulated barns and require a specific type of compost as a growing medium. This compost contains a mix of chicken manure, gypsum, hay, straw, and other nitrogen-containing compounds. Mushroom compost operations are recognised as playing a large role in the reduction of excess nutrient load from poultry operations and are regulated by the MCFR. The processing and packaging of mushrooms is considered part of the fruit and vegetable industry and is a prescribed industry under Schedule 2 of the WDR. Four mushroom and mushroom compost operations were visited as part of this audit; all were out of compliance.

FIGURE 13 – EXAMPLE OF GOODY WATER STORAGE OUT OF COMPLIANCE WITH MCFR

The non-compliances for each regulation were as follows:

MCFR:

- Goody water was not stored in an enclosed facility or facility maintained under negative pressure with air emissions directed to the air emission and treatment system (Schedule 3(1)(f))
- Failure to submit annual reports (Schedule 4 (3))
- Failure to post security (Schedule 5(1))
- Facility located on broken permeable surface (Schedule 3(1)(a))

AWCR:

- Escape of agricultural waste from storage facility (Section 6(b))
- Uncovered field storage during rainy season (October 1 to April 1)(Section 9)
- Discharge of agricultural waste directly to groundwater (Section 11)

EMA:

- Nine unauthorized discharges (Section 6(3)). Samples from two of these discharges found FCB concentrations to be 49/100mL and 460/100mL.

FIGURE 14 – EXAMPLE OF UNAUTHORIZED DISCHARGE

POULTRY SECTOR (6 OPERATIONS)

Six poultry facilities were inspected as part of this audit. All facilities consisted of long housing barns with numerous large air vents in various configurations to promote airflow inside the barns. Produce included turkey meat, chicken eggs and meat, and duck eggs and meat. All six poultry facilities were in compliance with the AWCR.

All poultry facilities stored agricultural waste inside storage facilities and had this waste removed by a contractor when required. In some cases the waste was stored in the poultry growing barns and removed by a contractor at the end of each growing cycle. Waste was also found stored in a separate facility, and transferred from the growing or laying area using a conveyor. All

storage facilities were covered indoor buildings (Figure 15) that did not allow the escape of agricultural waste to the environment. In all cases, mortalities from the poultry facilities were disposed of via incineration and were in compliance with the AWCR.

FIGURE 15 – EXAMPLE OF POULTRY WASTE STORAGE FACILITY IN COMPLIANCE WITH AWCR

None of the facilities inspected were aware of where the agricultural waste they produced was disposed of after being picked up by a waste disposal contractor. This represents a large knowledge gap as waste removal contractors are not a prescribed industry under EMA.

OTHER SECTORS (6 OPERATIONS)

Only one facility each of the pig, meat by-product, dairy, and cattle industries were inspected. Two land-based finfish operations were inspected; one was not registered and one had a registration but had not developed the site since this authorization was issued in 2009.

The non-compliances were as follows:

AWCR:

- Solid agricultural waste stored on a field for longer than 9 months (Section 8(2)(a))
- Escape of field-stored agricultural waste that causes pollution (Section 8(2)(c))
- Uncovered field storage during rainy season (October 1 to April 1)(Section 9)
- Agricultural waste being composted in a manner that causes pollution (Section 15(c))
- Confined livestock having access to a watercourse despite being held for more than 72 hours and having unmaintained access to the watercourse (Section 28(a) and (c))

EMA:

- Two unauthorized discharges (Section 6(3))

Overall Compliance Responses and Summary

Each facility that was inspected during this audit was assigned a compliance response. Compliance responses are based on consideration of the Non-Compliance Decision Matrix found in ENV Compliance and Enforcement Policy and Procedure, Version 4, 2018 (Appendix 4).

COMPLIANCE RESPONSES	
Notice	A letter issued to facilities found to be in compliance with their authorization or regulation requirements.
Advisory	An advisory letter is the first enforcement response taken in cases of minor to moderate non-compliance when there is a high likelihood of achieving compliance. An advisory, like a warning (below) serves as a formal record of the alleged non-compliance and forms an important element of the compliance history of the party in question.
Warning	Similar to an advisory, a warning letter notifies the non-compliant party in writing that they are not in compliance with a specific regulatory requirement; however, the warning differs from an advisory in that it warns of the possibility of an escalating response should non-compliance continue. Warnings are used when for moderate non-compliances where it is determined that an exchange of information alone would not be sufficient in achieving compliance.
Order	An order is a written, legal instrument issued by designated ministry officials used for major or continued non-compliances. Orders are an important tool in addressing compliance issues and managing environmental risk. An order requires parties to address noncompliance issues or take proactive measures to protect the environment. Non-compliance with an order creates an offence and may be prosecuted accordingly.

Overall, there were 28 Notices, 9 Advisories and 11 Warnings issued (Figure 16 and Figure 17).

FIGURE 16 – COMPLIANCE RESPONSE BY SECTOR

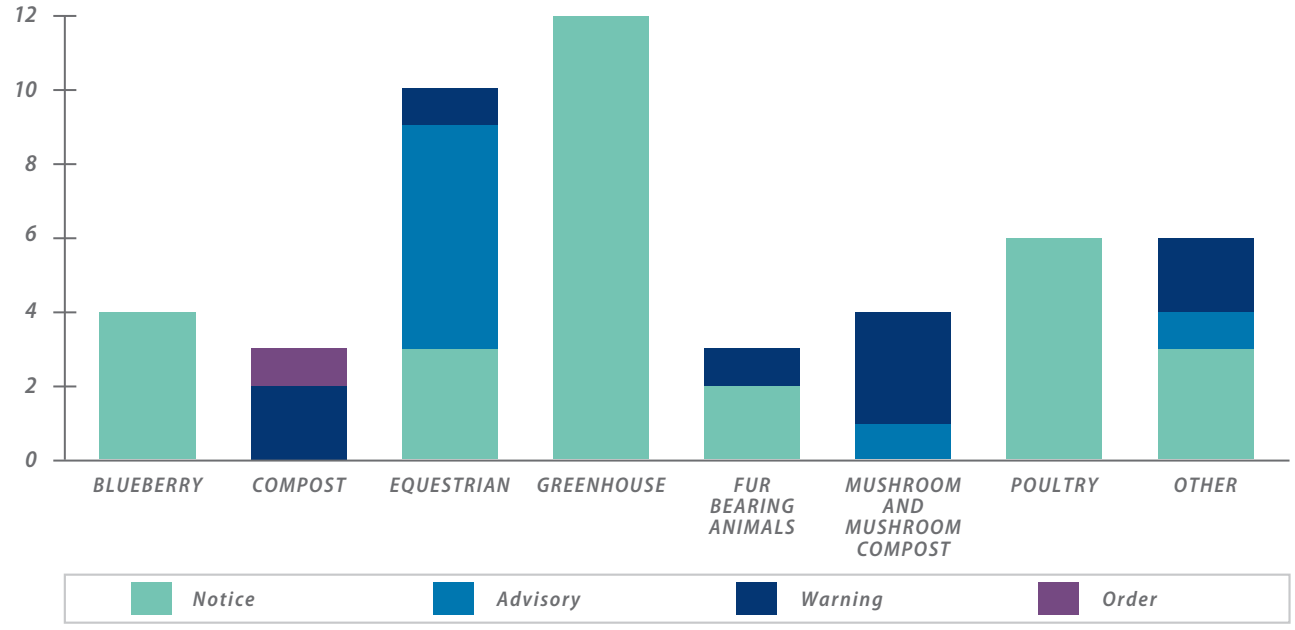
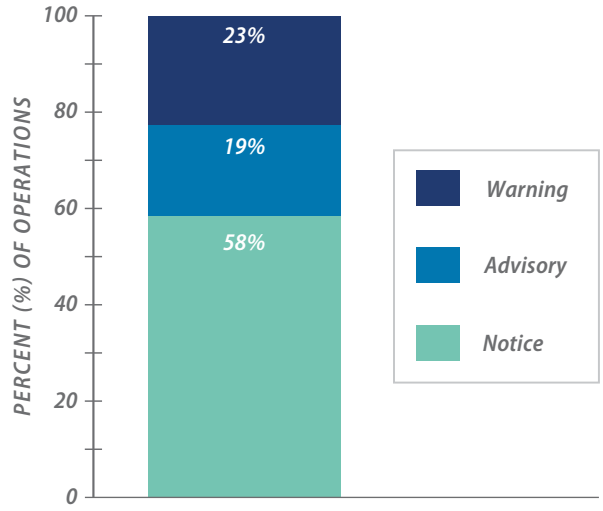


FIGURE 17 – FINAL ENV COMPLIANCE RESPONSE DETERMINATIONS



AWCR

Of the 48 operations inspected, 40 of them fell under the AWCR. The most common contraventions were with the following clauses:

- Six occurrences: Section 6(b), 'A storage facility must prevent the escape of any agricultural waste that causes pollution'
- Six occurrences: Section 9, 'In areas of the Province, including the Fraser Valley and Vancouver Island, that receive a total average precipitation greater than 600 mm (24 in) during the months of October to April inclusive, field stored solid agricultural wastes, except agricultural vegetation waste, must be covered from October 1 to April 1 inclusive to prevent the escape of agricultural waste that causes pollution.'

EMA – UNAUTHORIZED DISCHARGES

A total of 21 unauthorized discharges from 6 different agricultural or compost facilities were discovered during this audit. Discharge types included unlined ponds and ditches going to ground, as well as discharges to watercourses.

FIGURE 18 – ENV EPO SAMPLING AN UNAUTHORIZED DISCHARGE

Industry Challenges

The following were identified as challenges related to the industry:

- Lack of registration requirements for facilities operating under AWCR and OMRR. There are an unknown number of agriculture and composting facilities in operation in the province. Only agricultural facilities that use a boiler or heating system are required to register under the AWCR, and only compost facilities with a design production capacity of 5 000 tonnes are required to apply for an OMRR permit. This presents a huge challenge for ENV to identify operations as well as poses safety concerns when arriving to inspect facilities whose business type is unknown.
- Many operations are unaware of their requirements under EMA, AWCR or OMRR. This is highlighted by the nine facilities issued warnings for unauthorized discharges, seven of which are required to register under the AWCR or apply for a permit with the ministry.
- Equestrian facility owners expressed concern at costs associated with improving agricultural waste storage and complying with AWCR.
- Only three of the 48 operations (six percent) had been inspected by ENV officers prior to this audit. The 48 on-site inspections undertaken in the Nooksack River Watershed represent an estimated less than half of the total agricultural and compost facilities operating in the area.
- One authorized LFWCR operation was not in operation and had never been developed. The authorization holder was notified that their authorization should be amended or cancelled if no longer needed.
- Waste removal contractors represent a knowledge gap in the movement, use and disposal of agricultural waste. These operations are not a prescribed industry under EMA.

Conclusions/Recommendations

Overall agriculture and compost compliance was low for the operations inspected (58 percent), and even lower when the data was focused only on operations that use, produce, or store manure (44 percent).

The following recommendations are being proposed to improve industry compliance with each regulation as a result of the audit:

COMPLIANCE VERIFICATION AND PROMOTION

1. Continue inspections in the Nooksack River Watershed but focus on the following sectors: compost, dairy, equestrian, mushroom compost, mushroom growing, and organic blueberry operations. Inspections should take place during October 1 to April 1 or extended periods of high rainfall so as to capture the most challenging waste management conditions. Inspections should also take place during the manure application season.
2. Follow-up on completed inspections of non-compliant operations.
3. Provide information to agricultural and compost facilities to encourage compliance and promote awareness of the AWCR and OMRR. Examples include Ministry of Environment and Climate Change Strategy (ENV) reference documents: 'How to stay in compliance', 'What to expect from an inspection' and 'What to do if you're out of compliance'. Documents could be distributed through relevant industry associations such as the Horse Council of B.C.
4. Ensure future permits for agricultural and composting operations in the Nooksack River Watershed include limits for fecal coliform bacteria (FCB) and/or E. coli.
5. Participate in the Nooksack River Transboundary Technical Collaboration Group, provide updates on compliance activities and receiving environment monitoring, and assist in locating and remediating sources of FCB.
6. Expand ENV's current receiving environment monitoring program to include weekly samples during the rainy season and focus on accurate Bacterial Source Tracking analyses. This will improve identification of FCB sources (areas and sites), determine which livestock or wildlife contribute most to the fecal load in the Nooksack River Watershed, and help identify sectors for targeted compliance work.
7. Conduct agricultural and compost audits beyond this watershed and throughout the province. Inspections should take place during October 1 to April 1 so as to capture the most challenging waste management conditions.

FOR POLICY AND GOVERNMENT INITIATIVES

8. Update AWCR and OMRR to include registration requirements for all agricultural and compost operations.
9. Increase funding for Environmental Farm Plan Program and promote this initiative to agriculture operations to improve waste management practices.
10. Engage with waste removal contractors and promote best management practices. Waste removal contractors are not a prescribed industry under EMA, however they are a key player in the movement and disposal of agricultural waste in the Nooksack River Watershed.
11. Research whether tracking of agricultural waste should be regulated. Regulations could ensure waste removal operations adhere to waste management principles.

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Appendix 1 – List of Operations Included in the Audit

AUTHORIZATION NUMBER (IF APPLICABLE)	COMPANY NAME	APPLICABLE LEGISLATION
	93 Land Company Inc.	AWCR
	A&P Fruit Growers Ltd.	AWCR
	Alder View Dairy Ltd.	AWCR
105634	Atwal Farms	AWCR
	Bergen Farms Ltd	AWCR
105508	Blossom View Gardens	AWCR
	Blueberry Junction	AWCR
	Bordercreek Farms Ltd.	AWCR
	Bradner Hollow Farms	AWCR
	Canmor Farms	AWCR
	Carsons Stock Farm (1980) Ltd	EMA (WDR Schedule 1)
16879	Central Composting	MCFR
	Champ's Fresh Farms Inc.	EMA (WDR Schedule 2)
	Champ's Fresh Farms Inc. (New Land Mushroom Farm)	AWCR
12398	Consolidated Envirowaste Industries Inc.	EMA Effluent Permit
105925	Devan Greenhouses	AWCR
	Dogwood Fur Farms Ltd.	AWCR
	Emerald Acres	AWCR
	Garden Grove Nursery	AWCR
	Horse Play Your Way Training	AWCR
	Jump Start Stables Inc.	AWCR
105580	MB Greenhouses Ltd.	AWCR
105624	Merom Farms Ltd.	AWCR
105507	Mount Lehman Fruit Growers Ltd.	AWCR

AUTHORIZATION NUMBER (IF APPLICABLE)	COMPANY NAME	APPLICABLE LEGISLATION
	Paragon Farms (1)	AWCR
	Paragon Farms (2)	AWCR
105579	Peppertree Farms Ltd.	AWCR
	Private Landholder	AWCR
105848	Randhawa farms Ltd.	AWCR
103601	Raymond Halvorson	LFWCR
105581	Robinson Farms Inc.	AWCR
108119	Ross Land Mushroom Farm Ltd.	MCFR
	S&C Mallhi Farms	AWCR
	Sapphire Stables	AWCR
	Silver Star Stables & Equestrian Centre	AWCR
	Silverbrook U-Catch Trout Farm	LFWCR
	South Gladwin Heights Farm Ltd.	AWCR
	Sunrise Poultry Processors Ltd.	AWCR
	Sunselect Produce Inc.	AWCR
	The Grene Wode Manor Farm	AWCR
	Twin Creeks Ranch	AWCR
	Veratec Engineered Products Inc.	OMRR
	Wall's Farms Ltd.	AWCR
	Westview Poultry Farms Ltd.	AWCR
	Williams Fur Farm Ltd (1)	AWCR
	Williams Fur Farm Ltd (2)	AWCR
105610	Windsor Greenhouse Ltd.	AWCR
	Windsor Stables	AWCR

Appendix 2 – Non-Compliance Decision Matrix

The Non-Compliance Decision Matrix is a risk-based guidance tool for assessing the variability and severity of factors influencing the selection of compliance tools (Figure 18). These factors include:

- Escalating levels of environmental, human health or safety impacts (Figure 19).
- Diminishing likelihood of achieving compliance (Figure 20).

The Non-Compliance Decision Matrix helps to ensure a consistent and principled approach to assessing and responding to regulatory non-compliance; it is to be used with discretion by Ministry of Environment and Climate Change Strategy staff when considering the context and specifics of individual cases of non-compliance.

NON-COMPLIANCE DECISION MATRIX

diminishing likelihood of compliance (compliance history/willingness and capacity to comply)		*Escalating environmental, human health or safety (Actual or potential)*				
		Level 1	*Level 2*	*Level 3*	*Level 4*	*Level 5*
	Category A (High)	Advisory	Advisory - Warning	Warning - Order - Admin Sanction - AP - Investigation	Order - Admin Sanction - AP - Inestigation	
	Category B	Advisory - Warning	Warning - AP			
	Category C	Warning - AP	Warning - Order - Admin Sanction - AP - Investigation	Order - Admin Penalty - Admin Sanction - Investigation		
	Category D	Warning - Order - Admin - AP				
	Category E (Low)	Order - Admin Sanction - AP - Investigation				

Investigation

Note: An investigation is always necessary prior to issuance of a ticket, recommendation of formal charges or use of restorative justice therefore these tools are not shown on the matrix. Depending on the outcome, an investigation could also culminate in the issuance of a warning, administrative sanction or penalty, or an order.

CATEGORIES OF LIKELIHOOD OF COMPLIANCE

(Compliance History / Willingness and Capacity to Comply)

CATEGORY A – Indications of future and ongoing compliance are very high

- No previous occurrences of non-compliance;
- Good demonstrated awareness of and/or capacity to meet regulatory requirement; and/or
- Offender has a reasonable and cooperative attitude.

CATEGORY B – Indications of future and ongoing compliance are uncertain

- Few previous occurrences of non-compliance; and/or
- Questionable awareness of and/or capacity to meet regulatory requirement.

CATEGORY C – Indications of future and ongoing compliance are unlikely

- Numerous previous occurrences of non-compliance; and/or
- Little or no awareness of and/or capacity to meet regulatory requirement.

CATEGORY D – No indication of future and ongoing compliance

- Wilful violation of ministry regulatory requirement; and/or
- Little or no demonstrated willingness or capacity to meet regulatory requirement.

CATEGORY E – No indication of future and ongoing compliance

- Hindering or obstructing a ministry official;
- Refusing to furnish required information; and/or
- Intentionally including false or misleading information in any required document.

LEVELS OF ESCALATING ENVIRONMENTAL, HUMAN HEALTH OR SAFETY IMPACTS

(Actual or Potential)

LEVEL 1

- Non-compliance that does not result or is unlikely to result in any environmental, human health or safety impact; or
- Minor administrative non-compliance.

LEVEL 2

- Non-compliance resulting in a minor, temporary impact to the environment or minor, temporary threat to human health or safety; or
- Significant administrative non-compliance.

LEVEL 3

- Non-compliance resulting in a moderate, temporary impact to the environment or moderate, temporary threat to human health or safety.

LEVEL 4

- Non-compliance resulting in a significant impact to the environment or significant threat to human health or safety (may be temporary or permanent).

LEVEL 5

- Known or likely human health impact that is severe in effect, i.e. resulting in hospitalization and/or long term human health consequences

BRITISH
COLUMBIA