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Compliance Assessment of Agricultural Practices over Two Sensitive Drinking Water Aquifers in the Lower Fraser Valley, British Columbia October 2003 – February 2004

January 2005
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by

Environmental Protection Regional Operations
Lower Mainland Region
Ministry of Water, Land and Air Protection

(with funding support from Environment Canada under the Georgia Basin Action Plan)

Executive Summary

A compliance assessment of 105 farms overlying the Hopington (Langley) and Abbotsford-Sumas drinking water aquifers was conducted by the Ministry of Water, Land and Air Protection (WLAP) between October 2003 and February 2004. The compliance assessment was conducted in partnership with Environment Canada and in consultation with the Ministry of Agriculture, Food and Fisheries (MAFF) and farm organizations. As these drinking water aquifers are located in areas of intense agricultural activity, and the potential exists for this agricultural activity to have a negative impact on water quality, a compliance assessment was conducted to evaluate the level of compliance with the *Agricultural Waste Control Regulation* (AWCR) of the *Environmental Management Act*. The assessment found the following levels of compliance with the AWCR:

- 78% (82 of 105) of the farms inspected were in compliance,
- 66% (42 of 64) of the farms that produced or used manure or compost were in compliance,
- 77% (36 of 47) of the commercial agriculture farms that produced or used manure or compost were in compliance,
- 35% (6 of 17) of the hobby farms that produced or used manure or compost were in compliance,
- 13% (1 of 8) of the commercial agriculture farms that store manure or compost in their fields were in compliance with field storage requirements,
- 9% (1 of 11) of hobby farms that store manure or compost in their fields were in compliance with field storage requirements,
- 86% (30 of 35) of the commercial agriculture farms that spread manure or compost on their fields were in compliance with the land application requirements and
- 71% (5 of 7) of the hobby agriculture farms that spread manure or compost on their fields were in compliance with the land application requirements

Issues of non-compliance related primarily to the improper storage of agricultural byproducts. Many farms did not cover their manure or compost piles to prevent rain from potentially leaching contaminants into nearby groundwater used for drinking water and/or fish-bearing surface waters.

The assessment also addressed compliance with respect to the practice of spreading animal byproducts on fields. However, this issue was difficult to assess because farmers were generally not spreading manure at the time of their inspection nor were the majority of farms spreading liquid manure and therefore, only limited compliance data could be gathered on manure spreading practices. Finally, while not a legal requirement, the compliance assessment found that 76% (32 of 42) of the farms which used manure or compost did not have a nutrient management plan for their operations.

The compliance assessment included a review of agricultural complaints received in the Lower Mainland Region (both inside and outside the assessment area) during the

assessment period. A total of 32 agriculture complaints were received and non-compliance was confirmed in all cases. The complaints centered on two agricultural activities: the storage of agricultural byproducts and the spreading of these byproducts. 44% (14 of 32) related to improper storage of agriculture byproducts while 34% (11 of 32) of the complaints related to improper spreading of agricultural byproducts. This information indicates that non-compliance relating to spreading of agriculture byproducts is approximately the same level of magnitude as the non-compliance relating to storage of these byproducts and an additional compliance assessment of spreading of byproducts in areas where liquid manure is more commonly used may be warranted. An additional 7 complaints dealt with direct discharges and improper disposal of dead animals.

All farms assessed were advised of the legal requirements, specific areas of any non-compliance and the ramifications of not meeting the AWCR. They were also provided with information on how to prevent pollution from farming activities and comply with the AWCR.

Although enforcement activities continue to be used where necessary, it is anticipated that the agricultural sector will continue to adopt beneficial management practices to protect the environment. It is acknowledged that the agricultural sector is already leading various initiatives in their efforts to meet their environmental responsibilities. This includes broad-based participation in the Environmental Farm Plan (EFP) program, which is supported by government funding. It is recommended that agencies and farm organizations continue to expand their working relationship and collaborate on projects designed to improve compliance with the AWCR.

The compliance assessment makes the following key recommendations:

1) The agricultural sector should consider the results of this compliance assessment and continue to improve farm practices to prevent pollution and achieve compliance. This includes participation in the voluntary EFP program, which incorporates nutrient management planning by a qualified Planning Advisor;

2) All stakeholders, including farm organizations and government agencies, should continue to improve access to information by farmers to facilitate an understanding of environmental issues and to encourage adoption of environmentally sound farming practices. This would include using the internet to provide farmers with ready-access to information on funding available for improvements and practical information such as when manure should not be spread;

3) The Ministry should undertake a risk assessment of the potential for adverse environmental impacts that could result from non-compliance of commercial farms versus hobby farms;

4) The Ministry should initiate discussions with the horse industry to explore options to have horse farms improve their compliance with the AWCR;

5) An additional study to evaluate spreading of agricultural byproducts for compliance with the AWCR should be undertaken; and

6) Farm organizations and agencies should continue to work collaboratively to explore options that can lead to improved compliance with environmental legislation while ensuring economic sustainability of the industry. This would include promoting manure and compost as a valuable byproduct (when used properly) and finding alternative uses for the byproduct.

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1. Background

Agriculture producers and the public believe that it is important to protect the environment. The agriculture sector has made significant advancements in environmental stewardship over the past several years and is making ongoing efforts to promote and adopt beneficial management practices.

The provincial government enacted the *Agricultural Waste Control Regulation* (AWCR), including the Code of Agricultural Practice for Waste Management, on April 9, 1992 (Appendix E). It requires farmers to protect the environment including drinking water, fish-bearing waters and water used for irrigation. Areas that are particularly important to protect include drinking water supply aquifers that are vulnerable to contamination from land use activities.

Although the AWCR uses the term "agricultural waste" to denote manure, used mushroom medium and agricultural vegetation waste, the ministry, farmers and commodity associations agree that agricultural waste is a byproduct that has inherent value when used properly. As with many other business byproducts, when used improperly, these byproducts pose a threat to the environment and can result in pollution. For the purposes of this report, the term agricultural byproduct has been used in place of agricultural waste in the hopes that recognizing the inherent value of the byproduct will result in greater care and attention being given to the management of agricultural byproducts.

As part of a new provincial strategy to focus on various sectors that potentially pose a high risk to human health and the environment, the Ministry of Water, Land and Air Protection conducted a compliance assessment of farms located in two specific areas of the Lower Fraser Valley. Two sensitive drinking water aquifers were selected for the compliance assessment in consultation with the Ministry's Regional Hydrogeologist. These are the Hopington Aquifer in the Township of Langley and the Abbotsford-Sumas Aquifer (Figure 1). Both aquifers are classified as "IA", which means that there is relatively high demand for groundwater and the aquifers are highly vulnerable to contamination from land use activities above the aquifers due to the lack of overlying impermeable soils.

Groundwater monitoring results have shown that, in some areas of these two aquifers, the level of nitrate-nitrogen exceeds the Canadian drinking water guideline of 10 mg/L (as NO_3-N). Elevated nitrate levels can cause adverse human health effects such as Methemoglobinemia or "Blue Baby Syndrome" where nitrates can reduce the ability of blood to carry oxygen, and cause infants to turn blue. This is a serious health concern for infants as it can cause brain damage or, possibly, death. Furthermore, the Guidelines for Canadian Drinking Water Quality (Health Canada 1996) states that "...it is considered prudent to minimize exposure of the entire population to nitrate owing to suggestive evidence of an association in several populations between gastric cancer and moderate levels of nitrate in drinking water. The guideline is therefore intended to apply to both children and adults."

Agricultural operations are one of the major potential sources of nitrogen contamination due to the improper and overuse of animal manures and chemical fertilizers. Figure 2 shows how farming activities can potentially cause pollution of groundwater wells and fish-bearing surface waters.

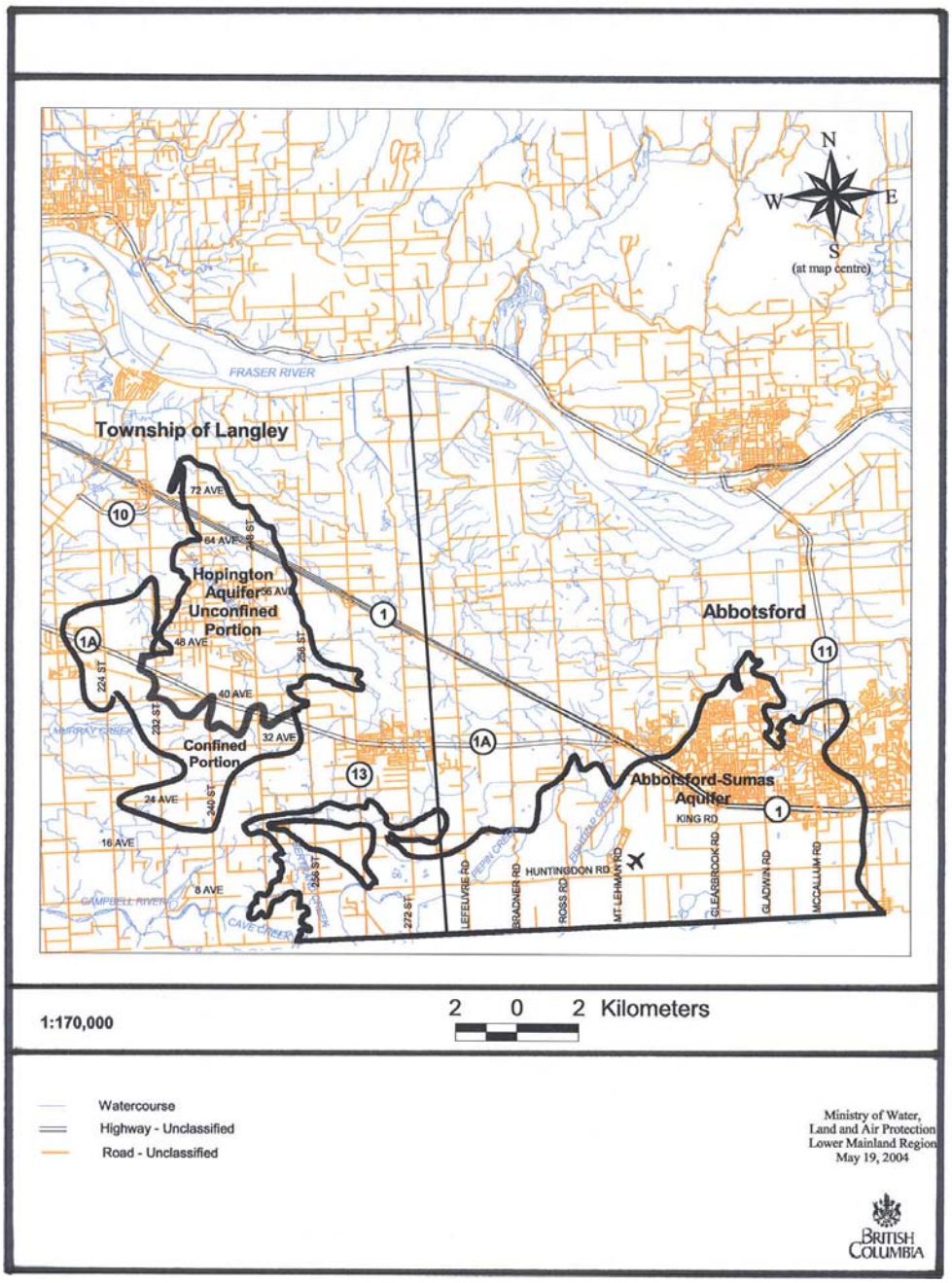

Figure 1: Map of Agricultural Assessment Area – Hopington and Abbotsford-Sumas Aquifers

Agricultural byproducts, such as animal manure and excess chemical fertilizer, can impact the environment by leaching contaminants into drinking water aquifers and causing contaminated surface runoff into fish-bearing waters (Figure 2). The contaminants can include various forms of nitrogen, pathogens (e.g. bacteria & viruses), suspended solids (which impede fish breathing capabilities and smother fish spawning areas) and organic substances which deplete oxygen from fish-bearing waters. The potential impacts from manure can range from fish kills to serious or fatal illnesses in humans, as was the case in the tragedy in Walkerton, Ontario.

Some of the surface waters in the assessment area, such as Pepin Creek and the Salmon River, support endangered fish species such as the Nooksack Dace (*Rhinichthys sp.) and/or* Salish Sucker (*Catostomus sp.*) as well as other species at risk.

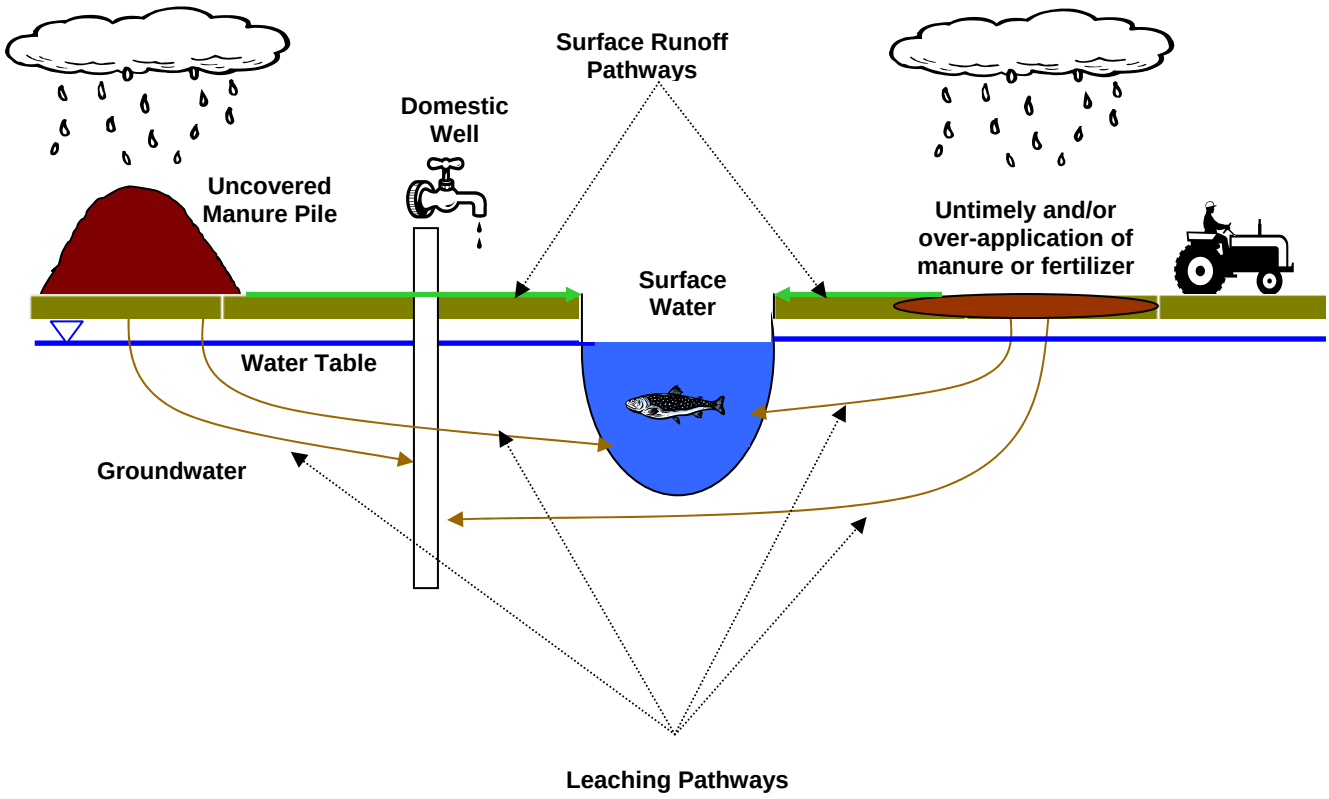

Figure 2: Examples of various pathways by which contaminants, such as nitrates and pathogens, can enter and cause pollution of the environment

During the assessment period, the farming community was contending with two animal/human health related issues: Bovine Spongiform Encephalopathy (also known as BSE or Mad Cow Disease) and Avian Influenza, which affected the poultry industry in the Lower Fraser Valley. The excellent response and cooperation of the agricultural sector during the compliance assessment, and their continuing efforts towards improving farm practices to protect the environment, is acknowledged and appreciated.

1.1 Information Bulletins

Prior to conducting this compliance assessment, information bulletins were prepared. Draft bulletins were provided to BC Agriculture Council, BC Milk Producers Association and MAFF. The Information Bulletin (Appendix A) was also provided to each farm that was assessed. It outlines the ministry's compliance strategy, provides background information on the assessment and information intended to help farmers achieve compliance and prevent pollution.

2. Objectives and Scope

2.1 Objectives

The primary objective of the compliance assessment was to assess the level of compliance of agricultural operations with the AWCR over two sensitive drinking water aquifers where there is a high risk of impact to human health and biodiversity values. Secondary objectives included evaluating the use of nutrient management plans and improving communication with producers and their associations.

2.2 Scope

A total of 105 agricultural operations of various types were assessed over the Hopington Aquifer in the Township of Langley and the Abbotsford-Sumas Aquifer (Figure 1). Field visits were conducted from October 2003 to February 2004. Some types of farming operations, which were considered to be low risk, were not included in the compliance assessment such as Orchard, Grain Production, Nut Farm, Apiary, Direct Farm Marketing and Veterinary Clinic. Subsequently, Residential "farms" and the following types of Hobby Farms were also excluded: Cultivated Land, Forage and Pasture. A site was considered to be a "Residential farm" if MAFF specified "Residential Use" as the primary activity on the site and "Agriculture" as a secondary or less important activity.

Over the course of the compliance assessment, it was determined that only a portion of the Hopington Aquifer is actually considered to be unconfined (Figure 1). This unconfined portion is not protected by an impermeable soil layer and is therefore at a higher risk with respect to the potential for contamination of the groundwater. Although five of the Hopington Aquifer area assessment sites were located outside of the unconfined portion, most of the Hopington sites focused on the unconfined portion due to the higher risk to human health. The results of the five assessments were included because these farms used or produced manure/compost and most had ditches or surface waters nearby which could be impacted. In addition, since significant time and effort was required to select and assess each individual farm, it was felt that the information was too valuable to exclude from this report.

3. Methodology

Potential assessment sites were selected from the provincial government's agricultural land use database updated to 2001 by MAFF. Initially, information was only available for the Langley area. Subsequently, MAFF conducted a farm land use inventory over a large portion of the Abbotsford–Sumas Aquifer in 2003 and provided the information to the Ministry of Sustainable Resource Management (SRM) for addition to the agricultural land information database.

The population of farms over the two aquifers, including the confined and unconfined portions of the Hopington Aquifer, was determined to be a total of 1662 farms (Appendix B). The population of farms over the unconfined portions of both aquifers was 1179 farms. 105 farms were randomly chosen as the sample population with 100 farms from the Abbotsford–Sumas Aquifer and the unconfined portion of the Hopington Aquifer and five additional sites from the confined portion of the Hopington Aquifer.

These five sites were selected from the original total population of 1662 farms in both aquifers (Appendix B). These five sites were assessed prior to determining that a portion of the Hopington Aquifer was confined and therefore at lower risk to pollution from land use activities. However, the results of these five assessments were considered to contain valuable information and, therefore, are included in the compliance assessment report.

The number of farms of each type was selected roughly in proportion to the number of farms of each type in the total population. The details of the site selection process are provided in Appendix B.

Once the sample size was selected, a questionnaire (Appendix C) was prepared, focusing on compliance with the AWCR. In general, the AWCR was turned into questions that could be answered during the on–site assessment, with the assistance of the farmer. The questionnaire also included general questions on manure production, storage and usage and other relevant information.

Compliance assessment inspections were conducted from October 2003 to February 2004 in the presence of the farmer. This period was chosen since it included the fall/winter rainy season when improper farming practices pose a higher risk to the environment. It is the period when field stored manure must be covered (Appendix E) and/or spreading of manure is generally not recommended.

It should be noted that farmers' responses were generally accepted as being accurate unless visual observations indicated otherwise. However, visual verification of information provided was not always possible. For example, since the compliance assessment was generally carried out during the rainy non-growing period when manure spreading is not appropriate, the spreading of manure was not observed during any of the site visits, except on one occasion. Therefore, compliance assessment of

manure spreading practices was largely based on information provided verbally by farmers.

Once collected, the data were entered into a computer spreadsheet (Appendix D). The spreadsheet was then reviewed for quality assurance and the compliance/non-compliance rates were calculated.

As a follow-up to the compliance assessment, letters were sent to all assessed farmers thanking them for their participation, indicating whether they were in or out of compliance and identifying any specific areas of non-compliance. The letters also advised farmers in non-compliance that failure to comply would be considered a violation of the Environmental Management Act and those violations may be subject to further action up to and including legal action. Also, included with the letters, was information on how to prevent pollution and comply with the AWCR.

The farm classifications (commercial agriculture & hobby) were taken from the MAFF database used to select farms for the compliance assessment. The MAFF guide to agricultural land use inventory states that "the 'Agriculture' designation, which is referred to as 'commercial' in this report, is used when farming is the only use, or the most important use. 'Hobby Farm' may be difficult to determine, but is used if farming is obviously recreational and of secondary importance to the residential use...Examples of hobby farms include homes with one or two horses, or a very small amount of crops which are not likely a significant source of income for the residents." For these reasons, there may be some inconsistencies between the classification listed on the database and field observations during the assessments (Appendix D). For example, three commercial farms reported having 3, 7 & 8 larger animals on site, whereas three hobby farms reported having 11, 12 & 20 larger animals on site. This may be due to some farms changing classifications since the database was established. Also, the best guess of the person conducting the agricultural land use inventory for the database may not be entirely accurate. Classifications of whether the farming activity is mainly for recreational purposes (hobby) or whether it is a significant source of income (commercial) may have been based on quick observations during a drive through the area to conduct the inventory. For consistency's sake, the classification used in the MAFF database was used in this compliance assessment.

As mentioned above, farms were sometimes assumed to be in compliance with specific requirements of the AWCR even though this could not be confirmed through field observations, simply because the farms were not carrying out the relevant farm practices at the time of the assessment. It was also assumed that farms were in compliance with AWCR requirements to prevent pollution, unless there were obvious signs of pollution based on field observations. No samples were taken of groundwater, surface water or the soil during the inspections to confirm that pollution was being prevented.

However, non-compliance with the AWCR was confirmed through field observation. Thus, there is a higher degree of confidence that a farm was in fact out of compliance

with the AWCR when the assessment was made during the assessment, whereas, there was a lower degree of confidence that a farm is actually in compliance when the assessment was made.

No testing of air emissions was conducted and, therefore, any compliance assessments on air emissions were based on casual field observations. Some sections of the AWCR were not assessed including Sections 18 and 19, which contain specific requirements for air emissions from wood fired boilers and odour control.

The management of pesticides was not considered within the scope of this compliance assessment because pesticide use is governed by the Pesticide Control Act and its regulations.

4. Results and Discussion

4.1 Compliance Assessment Results

Appendix D provides the spreadsheet containing all of the responses. Approximately 78% of all farms assessed were in compliance and 20% of all farms assessed were out of compliance with at least one requirement of the AWCR (Table 1). The compliance rate of 86% for commercial farms is significantly greater than the 50% compliance rate measured for hobby farms.

Table 1: Compliance Results for All Farms

Farm Class	No. of Farms (percentage in parentheses)			
	In Compliance	Out of Compliance	Compliance Undetermined	Farms Assessed
Commercial	71 (86%)	10 (12%)	2* (2%)	83
Hobby	11 (50%)	11 (50%)	0	22
Total	**82 (78%)**	**21 (20%)**	**2 (2%)**	**105**

* The compliance status of a berry farm and a cattle farm could not be determined because the berry farm was not spreading manure and the cattle were not on the cattle farm at the time of the assessments.

This discrepancy was not completely unexpected and is thought to relate to the fact that much more attention has been given to commercial operations by WLAP, MAFF and commodity associations for many years in terms of promoting environmentally sustainable farming practices. The unorganized nature of hobby farms makes it difficult to disseminate information to these farms.

Approximately 73% of the hobby farms were horse farms. While the Horse Council of BC maintains a website with environmental guidelines and other information, there are many horse farms that are not members of the council. It is likely that a large proportion of these non-members are not aware of existing environmental guidelines. The ministry

should explore options with the Horse Council of BC to disseminate the environmental guideline information to a wider audience.
Of particular interest to the ministry is the way in which agricultural byproducts are handled. Byproducts such as manure and compost have the potential to degrade water quality if stored or spread improperly.

Table 2: Compliance Results for Farms that Produce or Use Manure or Compost*

Farm Class	No. of Farms (percentage in parentheses)			
	In Compliance	Out of Compliance	Compliance Undetermined	Farms Assessed
Commercial	36 (77%)	10 (21%)	1 (2%)	47
Hobby	6 (35%)	11 (65%)	0	17
Total	**42 (66%)**	**21 (33%)**	**1 (2%)**	**64**

* A farm was considered to be a manure producer if manure was collected for spreading on land, used in composting or transported off site. A farm was considered to be a manure user if manure was applied onto the land.

For farms that produce or use manure or compost, the level of compliance with the AWCR decreases to 66% (Table 2). Furthermore, the compliance rate for commercial farms and hobby farms decreases to 77% and 35%, respectively (Table 2). The compliance assessment made no attempt to determine the relative risk between a non-compliant commercial farm versus a non-compliant hobby farm in terms of risk to the environment from handling of agricultural byproducts. Therefore, it is not clear which class of non-compliant farms pose a greater risk to the environment – Commercial or Hobby Farms. In order to effectively allocate ministry resources in the future, it is recommended that the ministry undertake such a risk assessment.

Tables 3 and 4 provide levels of compliance with storage (Sections 8(2)(c) & 9) and land application of the AWCR (Sections 11-14). These are the sections of the AWCR that are of the most interest to the ministry as non-compliance with these sections can pose a significant threat to the environment.

Table 3: Compliance Results for Field Storage of Manure or Compost (Sections 8(2)(c) and 9 of the AWCR)

Farm Class	No. of Farms (percentage in parentheses)			
	In Compliance	Out of Compliance	Compliance Undetermined	Farms Assessed
Commercial	1 (13%)	7 (88%)	0	8
Hobby	1 (9%)	10 (91%)	0	11
Total	**2 (11%)**	**17 (89%)**	**0**	**19**

Only 11% of farms that store manure or compost in their fields were in compliance (Table 3) with requirements for storing and covering manure and compost (Sections 8(2)(c) & 9, Appendix E). There was a negligible difference for commercial and hobby farms where the compliance rates were 13% and 9%, respectively. Typically, manure or compost storage piles were not properly covered (Figures 3-5) during the rainy season to prevent agricultural byproducts from escaping and causing pollution of drinking water aquifers or watercourses (Figures 3 and 4). It is important for piles of byproducts to be covered and located away from watercourses, particularly during the rainy season.

The compliance rate for land application of byproducts was significantly greater than that for storage (Table 4). Overall 83% of the farms were in compliance with Sections 11-14. The compliance rate for the commercial and hobby farms was slightly different at 86% and 71%, respectively. It is important to note that only 40% of farms assessed were in the practice of applying agricultural byproducts to the land. This was expected however as many of the commodity types (berry, poultry and horse) do not typically spread agricultural byproducts on their land. Nevertheless, the fact that a high compliance rate was obtained is a positive finding.

The majority of farms assessed for storing and spreading of agricultural byproducts used solid manure. This type of manure is easy to store for indefinite periods so that it can be spread at the correct time of year. Unfortunately, the low compliance rate mentioned above (Table 3) meant that many piles were not stored properly and pollution had the potential to occur. Only one of the 105 farms assessed in this study managed liquid manure. Operations that store liquid manure are limited by the amount of storage space they have. Inadequate storage can force farmers to spread liquid manure at the wrong time of year.

Since this compliance assessment was not representative of operations that manage liquid manure, it is recommended that a further assessment be developed to evaluate this aspect of the AWCR. This would typically involve dairy and hog operations to the east of the Abbotsford area.

Table 4: Compliance Results for Land Application of Agricultural Byproducts (Sections 11-14 of the AWCR)

Farm Class	No. of Farms (percentage in parentheses)			
	In Compliance	**Out of Compliance**	**Compliance Undetermined**	**Farms Assessed**
Commercial	30 (86%)	3 (9%)	2 (6%)	35
Hobby	5 (71%)	1 (14%)	1 (14%)	7
Total	**35 (83%)**	**4 (10%)**	**3 (7%)**	**42**

As noted above, the majority of farms did not have a nutrient management plan – regardless of farm type. Of the 42 farms applying agricultural byproducts to their land, 88% did not know the amount of manure they applied each year, 86% and 64% did not

test their manure or soils, respectively, for nutrient levels (Appendix D). In addition, only 12% of the farms consulted with a qualified professional regarding crop nutrient requirements and nutrient application rates. The Ministry believes that these numbers will have to increase in order for more responsible nutrient management to occur and for agricultural byproducts to be recognized as having intrinsic value as opposed to simply a waste. The EFP program would be an excellent method for increasing the awareness of the value of agricultural byproducts which should lead to improved management.

Figure 3: Poor Practice - Manure pile not covered with a tarp during the wet season from October 1 to April 1. Also, a pipe has been installed through the manure pile to drain a horse pasture area. This allows contaminated runoff to flow into the watershed of a sensitive creek located near the trees to the left. (November 27, 2003).

Figure 4: Poor Practice: Uncovered manure/compost causing leachate which flows to a creek that leads to fish-bearing waters (General File Photo).

Figure 5: Good Practice - Manure covered with a tarp to prevent rain from causing leachate seepage and contaminated runoff. Heavy objects are used to prevent the tarp from being blown off by wind. Storage pile is well away from any watercourses (February 25, 2004).

Thirteen different commodity types were assessed, however, only horse, cattle, pasture/forage, poultry and berry were of a sample size large enough to make preliminary statements regarding compliance rates of various commodity types (Table

5). Horse farms had the lowest overall compliance rate of 45% and berry farms had the highest compliance rate at 97% (Table 5).

Again, the Ministry needs to meet with representatives of the horse industry and explore ways to improve compliance by those farms. It is interesting to note that the increased compliance rate in the berry industry may, in part, be related to the shift away from the use of manures. Over the last ten years, the berry industry has moved to a preference for chemical fertilizers over animal manures as a source of fertilizer because chemical fertilizers are easier to handle and control rates of application. Unfortunately, this practice removes some of the land base from the area capable of accepting agricultural byproducts and puts pressure on the remaining landbases. Although, not thoroughly covered by this compliance assessment, the Ministry should evaluate in greater detail the rate of application of chemical and agricultural byproducts in relation to the actual crop nutrient demand on the land to which the byproducts are being applied. This could be a part of the future compliance assessment on spreading activities that was mentioned earlier.

Table 5: Compliance Results by Farm Type with the AWCR

Main Farm Type*	Farms that Produce or Use Manure/Compost		All Farms	
	No. In Compliance	No. Assessed	No. In Compliance	No. Assessed
Horse	9 (43%)	21	10 (45%)	22
Cattle	3 (60%)	5	4** (57%)	7
Nursery or Tree	1	2	6 (86%)	7
Pasture or Forage	4 (80%)	5	9 (90%)	10
Poultry	11 (92%)	12	12 (92%)	13
Berry	7** (100%)	8	33** (97%)	34
Hog/Sheep	0	1	0	1
Dairy	1	2	1	2
Mushroom	1	2	1	2
Field Vegetable	3	4	3	4
Vineyard	1	1	1	1
Mink	1	1	1	1
Donkey			1	1
Total	**42 (66%)**	**64**	**82 (78%)**	**105**

* Compliance data has been listed according to Main Farm Type, which is a more specific breakdown than Farm Group, which includes several farm types and was used in the site selection process (Appendix B).

** At one of the berry farms (which used manure) and one of the cattle farms (which did not produce or use manure at the time of the assessment), the compliance status was undetermined.

4.2 Agricultural Complaints

The Ministry has been recording agricultural complaints received by the Ministry's Lower Mainland Regional office for over 10 years. During the assessment period (October 2003 – February 2004), a total of 32 agricultural complaints were received by the office. Of these, 10 (31%) of the complaint sites were located over the two study aquifers. All complaints were verified by Ministry staff to be contraventions of the AWCR.

Of the 32 complaint sites, 14 (44%) were out of compliance with the requirements for storage of agricultural byproducts. This included sites that had not covered and/or contained their manure piles to prevent rain from leaching contaminants into the groundwater table or causing contaminated runoff to enter surface waters. The rate of non-compliance with storage requirements with respect to complaint sites was generally consistent with those of the compliance assessment which found that 33% of farms that produce or use manure/compost are out of compliance (Table 2).

Of the 32 complaint sites, 11 (34%) were out of compliance with the AWCR for improperly spreading agricultural byproducts. This included farms that discharged manure during the rainy non-growing season (Figure 6) when contaminants have a greater likelihood of leaching into the groundwater table or entering fish bearing waters via surface runoff instead of being taken up by growing crops that require nutrients. In contrast, the compliance assessment of individual farms did not indicate a similar level of non-compliance with respect to manure spreading requirements. As mentioned above, this is likely due to the fact that assessed farms generally used solid manure and not liquid manure and are therefore not limited by storage requirements and are less likely to have to spread during the no spread season.

Figure 6: Poor Practice - Manure is being spread during the wet non-growing season when contaminants can leach into the groundwater table or run off into fish-bearing waters instead of being taken up by crops that require nutrients for growth.

At six (19%) of the complaint sites, agricultural waste was directly discharged to the environment. One complaint site was found to be out of compliance with the requirements for proper disposal of mortalities.

Table 6: Number of Complaint Sites Out of Compliance* with the AWCR by Farm Type

Farm Type	Within Assessment Area	Within & Outside of Assessment Area
Dairy	1 (10%)	8 (25%)
Berry	4 (40%)	6 (19%)
Cattle	1 (10%)	6 (19%)
Horse	1 (10%)	5 (16%)
Hog	0 (0%)	2 (6%)
Poultry	1 (10%)	2 (6%)
Mushroom	1 (10%)	2 (6%)
Hobby**	1 (10%)	1 (3%)
Total	**10 (100%)**	**32 (100%)**

* Five miscellaneous complaints have not been included because they involved non-farm sites.

** The Hobby farm had a variety of animals on site including goats, llamas and donkeys.

Approximately 78% of the complaints within and outside of the assessment area involved Dairy, Berry, Cattle and Horse farms. Some types of farms that had a high

compliance rate in the assessment were the subject of a higher percentage of the complaints received. For example, Berry farms had virtually a 100% compliance rate during the compliance assessment (Table 5) but accounted for 19% of agricultural complaints overall and 40% of the complaints within the assessment area. Therefore, it is clear that each sector needs to continue to work with its members to improve awareness and compliance with the AWCR.

As a follow up to the identified non-compliances, two farms were given warnings, four farms were requested to prepare pollution prevention plans on how they would properly handle agricultural byproducts in the future and three farms were put under investigation, which may lead to future charges under the Environmental Management Act. In addition, the other complaints are also subject to further enforcement action if these operations do not bring their farms into compliance and are found to be causing ongoing pollution.

4.3 Environmental Protection Initiatives

Although many farms were out of compliance, particularly hobby farms, it is encouraging to note that the agricultural sector continues to develop proactive initiatives aimed at environmental protection and sustainable agriculture. These initiatives include:

- Retaining qualified professionals to carry out studies to measure soil nitrate levels and assess the impact of fertilizers and manure on the environment,
- Improving manure storage lagoons,
- Conducting studies that assist the understanding of the impacts of agriculture on the environment and develop methods of preventing pollution,
- Studying options for management of manure such as transporting it to nutrient deficient regions,
- Helping to get the environmental protection message out to individual farmers (Informing and educating individual farmers about the importance of environmental protection through various farm organizations) by email/newsletters or posting information on websites,
- Participating in forums with goals that include protection of the environment such as the BC Partnership Committee on Agriculture and the Environment,
- Participating in Environmental Farm Plan (EFP) program, which also provides access to government funding to improve farm practices.

5. Conclusions and Recommendations

The compliance assessment results indicate that both commercial (86% compliant) and hobby (50% compliant) were out of compliance with the AWCR, particularly hobby / horse farms. The compliance rate for both commercial (77% compliant) and hobby (35% compliant) farms is further reduced when only those farms which produce or use agricultural byproducts are examined. Although a lower percentage of commercial

agriculture farms were out of compliance compared with hobby farms, the percentage of non-compliance of both farm classifications is considered to be significant. It is also unclear what the relative difference is between a non-compliant commercial farm versus a non-compliant hobby farm in terms of potential adverse impacts to the environment.

The compliance assessment results indicate that a high percentage of the farms in non-compliance were hobby horse farms. Other types of farms found to be out of compliance, to a lesser degree, included nursery or tree, pasture or forage, poultry, hog/sheep, dairy, mushroom and field vegetable. The Ministry needs to work with the commodity associations to encourage all farm types to strive for improved compliance.

The majority of farms that used manures and that were assessed in this study used solid manure. Since the storage requirements are much more flexible for solid versus liquid manures, this study found minimal non-compliance of farms with the application requirements of the AWCR. It is recommended that a future study be designed to assess the compliance of liquid manure users with the application requirements of the AWCR.

A large percentage of farms continue to leave manure/compost piles uncovered during the rainy season (October 1 to April 1) when the potential for environmental contamination is high. It is imperative for farm organizations and farmers themselves to continue to encourage all farmers to store agricultural byproducts properly (Appendix F) and, if necessary, berm manure/compost piles to prevent pollution of drinking water aquifers and fish-bearing surface waters.

The complaints received by the Ministry during the assessment period, from both within and outside the compliance assessment area, indicate that a high percentage of the overall agricultural complaints involved dairy, berry, cattle and horse farms. Other complaints, to a lesser degree, involved the following farm types: hog, poultry, mushroom and goat/llama/donkey. In addition to improper manure/compost storage, a significant percentage of complaints also involved improper spreading of agricultural manure/compost such as applying agricultural byproducts during the rainy season. Other complaints included unauthorized direct discharges to the environment and one complaint regarding improper disposal of dead animals.

Most farms did not have a nutrient management plan and did not carry out testing, such as manure or soil analyses, to enable nutrients to be managed properly. Also, most farmers did not know the quantity of manure that they were applying. Nutrient management can be a complex issue; yet, few farms consulted with a qualified professional to obtain proper advice about nutrient management. The Ministry hopes that realization of the nutrient value inherent in agricultural byproducts will lead to these byproducts being recognized as something of value and not as a business waste and, therefore, will be handled with care.

Indeed, the compliance assessment revealed several cases where the value of agricultural byproducts was being recognized. In one case, a horse farm has worked out

an arrangement with a nearby nursery where a free bag of manure is provided with purchase of nursery tree or shrub. In another example, a horse farm made arrangements to supply manure to a neighbouring farm for use as crop fertilizer. These examples and the development of programs such as the Environmental Farm Planning (EFP) program, will hopefully lead to improvements in the management of agricultural byproducts.

The farm industry's voluntary participation in the EFP program is very encouraging. Participation in the EFP program is important for a variety of reasons. Participation encourages dialogue between professionals and farmers. Also, the EFP can focus on priority environmental protection issues such as development of nutrient management plans and provision of sufficiently sized storage facilities (Appendix F) for agricultural byproducts. EFPs can also include measures for preventing farm animals from direct access to watercourses where they can cause pollution and habitat destruction (by using measures such as proper setbacks, appropriate fencing and provision of offstream water supplies for animals).

All stakeholders, including farm organizations and government agencies such as MAFF and WLAP, should continue to improve their efforts to make information easily available to farmers, using methods such as the internet. The information that can be made readily available on web sites could include environmental regulations, how to comply with the environmental laws, how to prevent pollution from farming activities, advisories on "no spread times" for manure, information on the EFP program, how to obtain funding assistance and other information.

It would be useful to conduct another compliance assessment after a reasonable time period, such as 5 years, if sufficient resources are available. This would allow an assessment of improvements in nutrient management practices that result from the EFP program and other environmental protection initiatives.

The compliance assessment makes the following key recommendations:

1) The agricultural sector should consider the results of this compliance assessment and continue to improve farm practices to prevent pollution and achieve compliance. This includes participation in the voluntary EFP program, which incorporates nutrient management planning by a qualified Planning Advisor;

2) All stakeholders, including farm organizations and government agencies, should continue to improve access to information by farmers to facilitate an understanding of environmental issues and to encourage adoption of environmentally sound farming practices. This would include using the internet to provide farmers with ready-access to information on funding available for improvements and practical information such as when manure should not be spread;

3) The Ministry should undertake a risk assessment of the potential for adverse environmental impacts that could result from non-compliance of commercial farms versus hobby farms;

4) The Ministry should initiate discussions with the horse industry to explore options to have horse farms improve their compliance with the AWCR;

5) An additional study to evaluate spreading of agricultural byproducts for compliance with the AWCR should be undertaken; and

6) Farm organizations and agencies should continue to work collaboratively to explore options that can lead to improved compliance with environmental legislation while ensuring economic sustainability of the industry. This would include promoting manure and compost as a valuable byproduct (when used properly) and finding alternative uses for the byproduct.

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(http://www.stewardshipcanada.ca/sc_bc/stew_series/bc_stewseries.asp#ag)

Farmwest website (http://www.farmwest.com) which contains
- Manure spreading advisories
  (http://www.farmwest.com/index.cfm?method=pages.ShowPage&pageid=9)
- Nutrient management planning information
  (http://www.farmwest.com/index.cfm?method=library.showChapter&librarychapterid=16)

BC Agriculture Council website (http://www.bcac.bc.ca) which includes information on Environmental Farm Plan Program and how to get funding assistance
(http://www.bcac.bc.ca/agriculture_enviro_programs.htm)

Ministry of Agriculture, Food and Fisheries website with
- Environmental guidelines for producers
  (http://www.agf.gov.bc.ca/resmgmt/fppa/environ/envguide.htm)
- Information on how to cover manure piles
  (http://www.agf.gov.bc.ca/resmgmt/publist/300series/383100-3.pdf)
- Fact Sheet on Environmentally Friendly Horse Farm Through Better Manure / Waste Management, August 2003
  (http://www.agf.gov.bc.ca/resmgmt/publist/300series/386000-8.pdf)
- Environmental Guidelines for Horse Owners
  (http://www.agf.gov.bc.ca/resmgmt/fppa/environ/horse/horse.htm)
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  http://www.agf.gov.bc.ca/resmgmt/publist/300series/383100%2D2.pdf
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  http://www.agf.gov.bc.ca/resmgmt/publist/300series/383000-1.pdf

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http://www.agf.gov.bc.ca/resmgmt/publist/800series/830110-3.pdf

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Guidelines for Canadian Drinking Water Quality, Health Canada
Sixth Edition, 1996 (http://xnet.rrc.mb.ca/rcharney/water%20quality.pdf)
Update (http://www.hc-sc.gc.ca/hecs-sesc/water/dwgsup.htm)

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Ministry of Water, Land and Air Protection websites on
Agricultural impacts and solutions
(http://wlapwww.gov.bc.ca/wat/wq/nps/NPS_Pollution/Agriculture/Agriculture_Main.htm)
Offstream livestock watering
(http://wlapwww.gov.bc.ca/wat/wq/nps/Projects/Waterers/waterers.htm)
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Hopington Aquifer
(http://wlapwww.gov.bc.ca/wat/aquifers/aqmaps/hopington.html)
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(http://srmwww.gov.bc.ca/sry/csd/forms/p2/p2_ag_enforce.htm)
Environmental Trends in British Columbia 2002
(http://wlapwww.gov.bc.ca/soerpt/pdf/ET2002Oct221.pdf)

Pesticide Control Act Regulation
(http://www.qp.gov.bc.ca/statreg/reg/P/319_81.htm)

Pesticide Control Act (http://www.qp.gov.bc.ca/statreg/stat/P/96360_01.htm)

Integrated Pest Management Act (which is replacing the Pesticide Control Act)
(http://www.legis.gov.bc.ca/37th4th/3rd_read/gov53-3.htm)

Open Burning Smoke Control Regulation
(http://www.qp.gov.bc.ca/statreg/reg/W/WasteMgmt/WasteMgmt145/145_93.htm)

Waste Management Act (http://www.qp.gov.bc.ca/statreg/stat/W/96482_01.htm)

Environmental Management Act (which replaces the Waste Management Act) (http://www.legis.gov.bc.ca/37th4th/3rd_read/gov57-3-toc.htm)

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Committee on the Status of Endangered Wildlife in Canada website http://www.cosewic.gc.ca/eng/sct1/SearchResult_e.cfm

UN Water Virtual Learning Centre web site with information on Walkerton tragedy http://wvlc.uwaterloo.ca/biology447/modules/module4/enteropathogenic.htm

Environment Canada website (http://www.pyr.ec.gc.ca/EN/index.shtml) with information on the Georgia Basin Action Plan http://www.pyr.ec.gc.ca/georgiabasin/index_e.htm

Township of Langley website with information on protecting the Hopington Groundwater Management Area http://www.tol.bc.ca/Engineering/Environment/News_Room/47
City of Abbotsford website with information on the protecting the Abbotsford-Sumas Aquifer http://www.city.abbotsford.bc.ca/sitebuilder.asp?topic=Abbotsford-Sumas+Aquifer&rootname=Abbotsford-Sumas+Aquifer

Appendix A: Information Bulletins

Ministry of Water, Land and Air Protection
September 8, 2003 Lower Mainland Region

Agricultural Audit and Inspections to Help Protect Drinking Water

SURREY – Many agriculture producers and the public believe that it is important to protect the environment. The agriculture sector has made significant advancements in environmental stewardship over the past several years and are making ongoing efforts to promote and adopt beneficial management practices.
As part of a provincial strategy to focus on compliance activities of various sectors that potentially pose a high risk to human health and the environment, the Ministry of Water, Land and Air Protection plans to audit and inspect farms throughout the Fraser Valley (from small-scale farms to larger agricultural operations and including various commodity groups). The Ministry enforces the Agricultural Waste Control Regulation which requires farmers to protect the environment, including drinking water, fish-bearing waters and water used for irrigation, which could potentially transmit bacteria to consumers of ready-to-eat produce. Areas that are especially important to protect include aquifers vulnerable to contamination.

Conservation Officers will be focusing inspections on farms that are over the Abbotsford-Sumas, Hopington, Langley/Brookswood, and Vedder River Fan aquifers, in the Sumas River watershed. Attached is additional information on agricultural inspections conducted by the Conservation Officer Service. Inspections of agricultural operations to assess compliance may also be conducted by ministry staff in other areas of the province. Ministry staff will follow-up on known incidents of high risk to human health and the environment.
Farmers who discharge waste must comply with the Agricultural Waste Control Regulation and the Code of Agricultural Practice for Waste Management (http://www.qp.gov.bc.ca/statreg/reg/W/WasteMgmt/131_92.htm) and generally take any other measures necessary to prevent pollution. Farmers should note the following:

- Solid agriculture waste (manure) must be covered from October 1 to April 1 to prevent the escape of contaminants that cause pollution. Measures should be taken to prevent any tarps from being blown off. Manure piles must be at least 30 metres from any watercourse (including ditches, which eventually drain into fish-bearing waters) or domestic water source (e.g. drinking water well). (http://www.agf.gov.bc.ca/resmgmt/publist/300series/383100-3.pdf)
- Composting facilities and facilities used to store agriculture waste/manure must be located at least 15 meters from any watercourse and 30 meters from any domestic water source. The facilities should be covered and lined as necessary to prevent overflow or leakage. Storage facilities should have sufficient capacity to allow the land application of agriculture waste at appropriate times.
- Agriculture waste must be applied to land only as a fertilizer or as a soil conditioner. Therefore, manure should not be spread on bare land during the fall and winter. Bare land includes fields where crops such as corn and vegetables have been harvested, fields with poorly established cover crops, etc. In addition, manure should not be spread on grass fields during periods specified in Manure Spreading Advisories (http://www.farmwest.com/environment/index.cfm). Last fall/winter, Manure Spreading Advisories stipulated that spreading was not appropriate from November 1 to January 31. The risk of contaminated runoff or leaching of nutrients such as nitrates to surface or ground water is greatest during the wet fall/winter season when grass fields are not growing and therefore not using nutrients.
- Agricultural wastes, including manure, should not be applied:
    a) at rates of application that exceed the amount required for crop growth,
    b) on areas having standing water,
    c) on saturated soils,
    d) on frozen land or
    e) in diverting winds

as the risk of runoff or escape of agriculture waste is very high under these conditions.

- Livestock, poultry or farmed game feeding within a grazing area may access watercourses, provided measures are taken to ensure that the agricultural waste they produce does not cause pollution. Confined livestock operations in an outdoor, non-grazing area should be at least 30 metres from any watercourse (including ditches) or domestic water source. Also, pollution must be prevented from grazing areas.

- Farm animal mortalities should be managed in accordance with the regulation and in a manner that does not cause pollution.
- All other requirements of the Regulation must be met.

Agricultural producers are responsible for taking any other measures necessary to prevent pollution. Manure and other nutrients must be managed in a manner that does not cause pollution of groundwater or watercourses (http://www.farmwest.com/library/chapterindex.cfm?bookid=4&chapterid=37). Also, measures should be taken to prevent pollution from milk parlour wastes, pesticides (http://www.qp.gov.bc.ca/statreg/reg/P/319_81.htm), excessive use of chemical fertilizers, fuel spills, wood waste used for horse riding rings, etc.
Non-compliance with the Agricultural Waste Control Regulation may result in warnings, orders, tickets or prosecution under the Waste Management Act. Enforcement action will be determined on a site-specific basis and as appropriate to the circumstances.

Farmers looking for help in managing manure and meeting other requirements of the Regulation may wish to consult with any of the following sources:
- qualified professionals,
- BC Agriculture Council (http://www.bcac.bc.ca) and other agricultural organizations,
- Ministry of Agriculture, Food and Fisheries (http://www.agf.gov.bc.ca/resmgmt/fppa/environ/envguide.htm),
- Ministry of Water, Land and Air Protection
(http://wlapwww.gov.bc.ca/wat/wq/nps/NPS_Pollution/Agriculture/Agriculture_Main.htm)
(http://wlapwww.gov.bc.ca/wat/wq/nps/Projects/Waterers/waterers.htm),
- Agriculture and Agri-Food Canada (http://www.agr.gc.ca), and
- various websites/sources with information on best management practices such as
(http://www.nalms.org/bclss/agriculture.html).

(Note: If there is any conflict between legislation and this Bulletin, the legislation applies.)

attach.

Agricultural Inspections conducted by the Conservation Officer Service

The purpose of this document is to facilitate the understanding of the Conservation Officer Service role in the inspection / investigation of an agricultural site.

Conservation Officers and compliance officers within the Environmental Protection section of the Ministry of Water, Land and Air Protection conduct inspections and investigations. Together they investigate potential violations of the Pesticide Control Act (http://www.qp.gov.bc.ca/statreg/stat/P/96360_01.htm), Waste Management Act (http://www.qp.gov.bc.ca/statreg/stat/W/96482_01.htm), Agricultural Waste Control Regulation, and the Open Burning Smoke Control Regulation (http://www.qp.gov.bc.ca/statreg/reg/W/WasteMgmt/WasteMgmt145/145_93.htm).

Procedures

When an officer arrives at an agricultural site the officer may interview the owner, manager or employee to determine compliance with the legislation. This interview may be formal or informal depending on the circumstances.

Officers are inspecting for many potential violations under the appropriate legislation. They may include but are not limited to:

- Inspection of the dairy parlour to determine if waste is discharged into a nearby creek or if the discharge will cause pollution
- Inspection of manure storage facilities to determine if manure is either leaching into a nearby watercourse or if any discharges will cause pollution.
- Investigation of manure applied on harvested cornfield in the fall.
- Investigation of manure applied during the no spread period.
- Inspection of open burning to determine if burn will cause pollution (i.e. burning of prohibited material)
- Inspect / investigate potential violations relating to pesticide use and storage

Officers may take samples, interview owners, managers and employees, take photographs and/ or record video of the area.

When an officer is considering charging or warning a person for violations of the legislation he/she will consider the following:

- Substantial likelihood of conviction
- Seriousness of the violation and impact to the environment
- Compliance of the suspect
- Previous history of the suspect

If a violation is found the officer has three choices relating to enforcement action. The officer can issue a written warning, issue a violation ticket, or arrange for a court appearance for formal charges to be laid against the person or company. When a formal charge is either being considered or is laid the officer may either issue an appearance notice at the time of the inspection or issue a summons at a later date. Both documents will compel the person to appear in court on the indicated date.

Agricultural owners are encouraged to obtain and review the manure Management Guidelines for the Fraser Valley. This brochure can be picked up or mailed out from the Ministry of Agriculture Food and Fisheries located in Abbotsford. Call 604-556-3100.

Appendix B: Site Selection Criteria

Audit Site Selection

A. Process For Selecting Sample of Farms to Audit

- Group farms within each of the 3 classifications of farms: “Agriculture”, “Hobby Farm” and “Residential” and develop a group numbering system (Attachment 1). [Note: In the audit report, “Agriculture” sites are referred to as “Commercial” or “Commercial Agriculture” sites.]

- Edit each of the Abbotsford & Langley Excel spreadsheets containing data provided by MAFF as follows:

    1. Delete unnecessary columns from each spreadsheet.
    2. Delete all farms not on the Hopington or Abbotsford-Sumas aquifer.
    3. Delete all farms where the primary activity (ACT1) is blank or where ACT1 does not have a primary agricultural activity (AG1) associated with it.
    4. Categorize those farms where ACT1 is listed as something other than “Agriculture”, “Hobby Farm” or “Residential” into the proper category based on available information.
    5. Delete farms that are listed as “Abandoned”, “Not In Use” or “In Fallow”.
    6. Delete farms with duplicate addresses.
    7. Based on information provided, assign a unique identification number to each of the remaining farms.

- Combine the above edited lists.

- Determine the total number of farms eligible for auditing, the number of farms in each category and the percentage that each group represents within each category.

- Desiring a sample size of approximately 10%, set an initial target of 150 farms (in 2 groups of 75) for the audit. The reasoning for the 2 groups is so that the sample size can be adjusted without affecting the randomness of the audit.

- Using the above sample size, determine the number of farms to be audited in each group (Attachment 2).

- Utilizing a random number generator, select the required number of farms from each group. Approximately 30 to 50% extra farms are chosen from each group to be used as “backups” if the initial farm cannot be audited for whatever reason.

B. Modifications to the List of Farms Selected for the Audit

- In late October 2003, it was determined that the Hopington Aquifer contains both an unconfined portion (which is at a higher risk of pollution from farming activities) and a confined portion. Therefore, farms on the confined portion were removed from the Langley spreadsheet (Hopington Aquifer) because they posed a lower risk of groundwater pollution. With the reduction in farms eligible for auditing, the number of farms in each category and the percentage that each group represents within each category were recalculated. This resulted in a change to the number of farms to be audited in each group. Every effort was made to retain those sites previously chosen and to maintain randomness of the sample selection.

- In early December 2003, it was determined that a sample size of 150 farms was too ambitious, considering resources available. Therefore, the sample size was reduced to 100. A contingency plan was developed to increase the sample size to 120, should time permit. Also, it was decided that the following should be excluded from the list of farms to be audited (Attachment 3): Cultivated Land, Pasture and Forage farms (from Group 3H), as well as Residential farms. This required the number of farms in each group to be amended. Again, every effort was made to retain those sites previously chosen and to maintain randomness of the sample selection (Attachment 4).

- As needed and at the request of the audit team, additional "backups" were chosen from various groups.

Appendix B: Attachment 1

Initial Farm Group Numbering System

(revised September 26, 2003)

Definitions:

Class	General classification of farm (Agriculture, Hobby or Residential)
Type	Specific type of farm
Group	A combination of a number similar types

Groups and Types within each class:

Agriculture

1A	Dairy
2A	Poultry
3A	Horse & Horse/Beef
4A	Berry & Field Vegetable & Specialty Crop & Vineyard
5A	Beef Cattle & Beef Dairy
6A	Swine & Sheep/Goat & Ratite & Llama/Alpaca & Fur & Poultry (back yard flock)
7A	Nursery & Nursery (including greenhouse) & Turf Farm
8A	Pasture & Forage & Cultivated Land
9A	Mushroom
10A	Poultry/Berry

Hobby Farms

1H	Horse & Horse/Beef & Horse/Sheep/Goat
2H	Beef Cattle & Beef/Sheep/Goat
3H	Cultivated Land & Nursery & Pasture & Vineyard & Berry & Forage & Field Vegetable
4H	Sheep/Goat & Poultry & Llama/Alpaca & Game Bird & Dairy & Ratite & Poultry (back yard flock) & Livestock Type Unknown

Residential

1R	All Residential “Farms”

Initial Farm Breakdown Based on 150 Audit Sites

Total # of farms meeting audit criteria over Hopington and Abbotsford-Sumas aquifers:

	Agriculture	Hobby	Residential	Total
Abbotsford	662	73	4	739
Langley	366	330	227	923
Total	1028	403	231	1662

The total population of Agriculture, Hobby and Residential sites is 1662.

Of the total Agriculture and Hobby Farms (1434), 72% are Agriculture and 28% are Hobby Farms.

The initial target was a total sample size of 150 farms (in 2 groups of 75 farms). Based on a sample size of 75 farms in each group and arbitrarily selecting 5 Residential Farms, the remaining 70 farms would consist of 50 Agriculture and 20 Hobby Farms. The breakdown by group for each sample of 75 farms to be audited would be as follows:

Agriculture				Hobby Farms			
Group	Total	%	# of farms audited	Group	Total	%	# of farms audited
1A	26	2.53	1	1H	246	61.04	12
2A	114	11.09	6	2H	44	10.92	2
3A	80	7.78	4	3H	73	18.11	4
4A	449	43.68	21*	4H	40	9.93	2
5A	69	6.71	3				
6A	29	2.82	1				
7A	63	6.13	3				
8A	156	15.18	8				
9A	10	0.97	1				
10A	32	3.11	2				
Total	1031	100	50		403	100	20

* The Target # of Farms to be audited in Group 4A was adjusted from 22 to 21 to ensure that the Total # of Agriculture Farms would add up to 50.

Revised Farm Group Numbering System

(revised December 12, 2003)

Definitions:

Class General classification of farm (Agriculture, Hobby or Residential)
Type Specific type of farm

Group A combination of a number similar types

Groups within each class:

Agriculture

1A Dairy
2A Poultry
3A Horse & Horse/Beef
4A Berry & Field Vegetable & Specialty Crop & Vineyard
5A Beef Cattle & Beef Dairy
6A Swine & Sheep/Goat & Ratite & Llama/Alpaca & Fur & Poultry (back yard flock)
7A Nursery & Nursery (including greenhouse) & Turf Farm
8A Pasture & Forage & Cultivated Land
9A Mushroom
10A Poultry/Berry

Hobby Farms

1H Horse & Horse/Beef & Horse/Sheep/Goat
2H Beef Cattle & Beef/Sheep/Goat
3H Nursery & Vineyard & Berry & Field Vegetable
4H Sheep/Goat & Poultry & Llama/Alpaca & Game Bird & Dairy & Ratite & Poultry (back yard flock) & Livestock Type Unknown

Note: The following types of sites have been removed: Residential "Farms" (Group 1R) and Cultivated Land, Pasture and Forage Farms (from Group 3H)

Revised Farm Breakdown Based on 100 Audit Sites and Reduced Hopington Aquifer Area

Total # of farms meeting revised audit criteria over Abbotsford-Sumas Aquifers and unconfined portion of Hopington Aquifers:

	Agriculture	Hobby	Total
Abbotsford	662	30	692
Langley	281	206	487
Total	943	236	1179

Of the total agriculture and hobby farms (1179), 80% are agriculture and 20% are hobby farms.

Based on a sample size of 100 farms, the audit would consist of 80 agriculture and 20 hobby farms. The breakdown by group would be as follows:

Agriculture				Hobby Farms			
Group	Total	%	# of farms audited	Group	Total	%	# of farms audited
1A	22	2.33	2	1H	170	72.03	14
2A	110	11.66	9	2H	27	11.44	2
3A	53	5.62	4	3H	15	6.36	2*
4A	445	47.19	38	4H	24	10.17	2
5A	49	5.20	4				
6A	26	2.76	2				
7A	55	5.83	5				
8A	144	15.27	12				
9A	7	0.74	1				
10A	32	3.39	3				
Totals	943	100	80		236	100	20

* The Target # of Farms to be audited in Group 3H was adjusted from 1 to 2 to ensure that the Total # of Hobby Farms would add up to 20, which is 20% of a sample size of 100 farms.

Appendix C: Questionnaire

Farm ID no._____

Date: (yymmdd)		Type of farm:	
Name of farm:		Years in operation:	
Address of farm:		Aquifer (H/AS)	
Mailing address of farm:			
Name of owner/operator:		Phone no.:	
Name of person participating in audit:		Phone no.:	
Ministry representative:		Weather conditions:	

I. Manure Production

Type of animals:					
No. of animals:					

Amount of manure produced per year: _____ (tonnes)
Percentage of manure sent off site: _____ %
Location (city) sent to: _____ Transporter/hauler: _____

II. Manure Storage

a) Liquid Manure Storage

Earthen lagoon (Y/N)		Concrete pit (Y/N)			
Storage facility is:	Lined (Y/N)		Covered (Y/N)		
Pump or other system to remove rainfall from cover (Y/N)					
Maximum storage capacity (m^3)			Minimum freeboard (m)		

b) Solid Manure Storage

Impermeable pad (Y/N)		Field storage (Y/N)					
Permanent storage facility (building) (Y/N):		Bin (Y/N):		Other:			
Storage facility is:	Covered (Y/N)		Contained to prevent discharge (Y/N)				

III. Manure Use

Crop type:					
Crop land area (ha):					
Is crop field tile drained?(Y/N):					
Total Amount of manure applied on all crops: (tonnes/year)					

Is manure tested for nutrient content (Y/N) _____ Is soil tested for nutrient content (Y/N) _____
Crop nutrient requirement determined by: Farmer (F) _____ Qualified professional (QP) _____
Industry Guidelines (IG) _____ Other _____
Nutrient application rate determined by: Farmer (F) _____ Qualified professional (QP) _____
Industry Guidelines (IG) _____ Other _____
Nutrient management plan prepared by: Farmer (F) _____ Qualified professional (QP) _____
Other _____ Not in place (N) _____
Crop nutrient requirements met with: manure ____% chemical fertilizer ____% compost ____%

Are there any drainage watercourses on or adjacent to the property? (Y/N) _____
Is ditch/surface water used for washing (W) _____ or irrigation (I) _____ of ready-to-eat produce? If so, are MAFF guidelines for using ditch/surface water for ready-to-eat produce followed? (Y/N)_____

IV. Comments

AGRICULTURAL WASTE CONTROL REGULATION REQUIREMENTS

	In	Out	UD	NA	Comments
PART 4 — STORAGE AND USE OF AGRICULTURAL WASTE					
Allowable storage					
4 Is the agricultural waste stored on the farm produced or used on the farm?					
Storage methods					
5 Is the agricultural waste stored either in a storage facility, as field storage or in the case of fur bearing animals, under outdoor pens?					
Storage facility					
6 (a) Is the storage facility of sufficient capacity to store all the agricultural waste produced or used on the farm for the period of time needed to allow for the application of agricultural waste as a fertilizer or soil conditioner, or the removal of agricultural waste?					
6 (b) Does the storage facility prevent the escape of any agricultural waste that causes pollution?					
6 (c) Is the storage facility maintained in a manner to prevent pollution?					
Location of storage facility					
7 (1) Is the storage facility located at least 15 m from any watercourse?					
7 (1)(a) Is the storage facility located at least 30 m from any source of water used for domestic purposes?					
7 (2) Subsection (1) does not apply to a storage facility existing prior to April 1, 1992 provided that a report demonstrating to the satisfaction of the manager that no pollution of any watercourse or domestic water supply is occurring from the storage facility, produced by a person with professional qualifications in the field of environmental assessment and licensed to practice in British Columbia, or staff of the Ministry of Agriculture, Fisheries and Food under a Best Agricultural Waste Management Plan is made available to the manager within 12 months of his or her request.					
Field storage					
8 (1) If solid agricultural waste is stored on a field for 2 weeks or less, is it stored in a manner that prevents the escape of agricultural waste that causes pollution?					
8 (2)(a) Is solid agricultural waste stored on a field for more					

than 2 weeks but stored for no longer than 9 months?					
8 (2)(b)(i) Is it located at least 30 m from any watercourse?					
8 (2)(b)(ii) Is it located at least 30 m from any source of water used for domestic purposes?					
8 (2)(c) Is it stored in a manner that prevents the escape of agricultural waste that causes pollution?					
8 (3) Are berms or other works constructed around the field storage area if this is necessary to prevent the escape of agricultural waste that causes pollution?					

	In	Out	UD	NA	Comments
Rainy season field storage					
9 Is field stored solid agricultural wastes, except agricultural vegetation waste, covered from October 1 to April 1 inclusive to prevent the escape of agricultural waste that causes pollution?					
Under pen storage					
10 (1) Is agricultural waste from fur bearing animals stored under their outdoor pens for no longer than 9 months?					
10 (1)(a) Does the storage area under their pens prevent the escape of any agricultural wastes that causes pollution?					
10 (1)(b)(i) Is the storage area under their pens located at least 15 m from a watercourse?					
10 (1)(b)(ii) Is the storage area under their pens located at least 30 m from any source of water used for domestic purposes?					
10 (2) Subsection (1) (b) does not apply to a pen constructed prior to April 1, 1992 provided that a report demonstrating to the satisfaction of the manager that no pollution of any watercourse or domestic water supply is occurring from the under pen storage facility, produced by a person with professional qualifications in the field of environmental assessment and licensed to practice in British Columbia, or staff of the Ministry of Agriculture, Fisheries and Food under a Best Agricultural Waste Management Plan is made available to the manager within 12 months of his or her request.					

PART 5 — APPLICATION AND COMPOSTING OF AGRICULTURAL WASTE

Discharge to water					
11 Is it ensured that agricultural waste is not directly discharged into a watercourse or groundwater?					
Allowable application					
12 Is agricultural waste applied to land only as a fertilizer or a soil conditioner?					
Prohibited application					
13 Is it ensured that agricultural waste is not applied to the land if, due to meteorological, topographical or soil conditions or the rate of application, runoff or the escape of agricultural waste causes pollution of a watercourse or groundwater?					
Conditions unfavourable to application					
14 (a) Is it ensured that agricultural wastes are not applied on frozen land if runoff or escape of agricultural waste causes pollution of a watercourse or groundwater, or goes					

beyond the farm boundary?					
14 (b) In diverting winds if runoff or escape of agricultural waste causes pollution of a watercourse or groundwater, or goes beyond the farm boundary?					
14 (c) On areas having standing water if runoff or escape of agricultural waste causes pollution of a watercourse or groundwater, or goes beyond the farm boundary?					
14 (d) On saturated soils if runoff or escape of agricultural waste causes pollution of a watercourse or groundwater, or goes beyond the farm boundary?					

	In	Out	UD	NA	Comments
14 (e) Or at rates of application that exceed the amount required for crop growth, if runoff or escape of agricultural waste causes pollution of a watercourse or groundwater, or goes beyond the farm boundary?					
Composting					
15 (a) Does the agricultural waste composted on the farm consist only of agricultural waste and is it produced on that farm or produced elsewhere but being composted for use on that farm only?					
15 (b)(i) Is the composting site located at least 15 m from a watercourse?					
15 (b)(ii) Is the composting site located at least 30 m from any source of water used for domestic purposes?					
15 (c) Is the agricultural waste composted in a manner that does not cause pollution?					
Composting for mushroom medium					
16 (1)(a) Is the agricultural waste composted on the farm for the production of mushroom medium being composted for use on that farm only?					
16 (1)(b)(i) Is the composting site is located at least 15 m from a watercourse?					
16 (1)(b)(ii) Is the composting site is located at least 30 m from any source of water used for domestic purposes?					
16 (1)(c) Is the medium composted in a manner that does not cause pollution?					
16 (2) Subsection (1) (a) and (b) does not apply to a composting operation and site existing prior to April 1, 1992 provided that a report demonstrating to the satisfaction of the manager that no pollution of any watercourse or domestic water supply is occurring from the composting operation and site, produced by a person with professional qualifications in the field of environmental assessment and licensed to practice in British Columbia, or staff of the Ministry of Agriculture, Fisheries and Food under a Best Agricultural Waste Management Plan is completed by April 1, 1993 and is made available to the manager at his or her request.					

PART 6 – AGRICULTURAL EMISSIONS

Emissions					
17 Is it ensured that emissions from forced air ventilation systems on the farm do not cause pollution?					

PART 7 — STORAGE AND USE OF WOOD WASTE

Allowable use

20 Is wood waste on the farm used only for plant mulch, soil conditioner, ground cover, on-farm access ways, livestock bedding and areas where livestock, poultry or farmed game are confined or exercised, berms for cranberry production, or fuel for wood fired boilers?					
Storage					
21 (a) Is wood waste stored and used on the farm handled so as to prevent any escape of particulate or solid matter from the wood waste into the air?					

	In	Out	UD	NA	Comments
21 (b) Is wood waste stored and used on the farm handled so as to prevent any escape of particulate or solid matter or leachate from the wood waste into any watercourse or groundwater that causes pollution?					
Prohibited use					
22 (a) Is it ensured that wood waste used on the farm not be used for landfill?					
22 (b) Is it ensured that wood waste used on the farm not be used on sites within 30 m of any source of water used for domestic purposes with the exception of existing sites under use prior to April 1, 1992, provided that this use is not causing pollution?					
PART 8 — ON-FARM DISPOSAL OF MORTALITIES					
Burial and incineration					
23 (1)(a) Do mortalities disposed of on-farm by burial or incineration originate from this farm?					
23 (1)(b) Is it ensured that the disposal does not cause pollution?					
23 (1)(c)(i) Where disposal is to land, are the burial pits covered?					
23 (1)(c)(ii) Where disposal is to land, are the burial pits located at least 30 m from any source of water used for domestic purposes?					
23 (1)(c)(iii) Where disposal is to land, are the burial pits constructed to prevent the escape of any agricultural waste that causes pollution?					
23 (1)(d) Where disposal is by incineration, do the emissions from an incinerator not exceed 180 mg per cubic metre of particulate matter and 20% opacity, except that (i) for a permanent incinerator installed before April 1, 1992 and not operating under a waste management permit, emissions must not exceed 230 mg per cubic metre of particulate matter and 20% opacity, and (ii) for a permanent incinerator installed before April 1, 1992 and operating under a waste management permit, the emission levels required by that permit apply unless those levels exceed the levels specified in (i)?					
Composting					
24 (a) Do mortalities composted on-farm originate from this farm?					
24 (b)(i) Is the composting site located at least 15 m from a watercourse?					
24 (b)(ii) Is the composting site located at least 30 m from any source of water used for domestic purposes?					

24 (c) Is it ensured that the composting does not cause pollution?					

PART 9 — FEEDING AREAS AND ACCESS TO WATER

Grazing areas					
25 Is it ensured that agricultural waste produced by livestock, poultry or farmed game feeding within a grazing area with access to watercourses does not cause pollution?					

	In	Out	UD	NA	Comments
Seasonal feeding areas					
26 (1)(a) Is the seasonal feeding area for livestock, poultry or farmed game operated in a way that does not cause pollution?					
26 (1)(b) Does the seasonal feeding area have berms where necessary to prevent agricultural waste runoff from causing pollution?					
26 (2)(a) Are locations for feeding livestock, poultry or farmed game within a seasonal feeding area, including locations for movable feed bunks, located at least 30 m from a high tide watermark, a watercourse or the bank of a watercourse, unless written permission has been obtained from the manager for a closer location?					
26 (2)(b) Are locations for feeding livestock, poultry or farmed game within a seasonal feeding area, including locations for movable feed bunks distributed throughout the area to ensure that manure from the feeding of livestock, poultry or farmed game is spread as a fertilizer or soil conditioner and that no accumulation of manure causes pollution?					
26 (3) Where permanent feed bunks are used within a seasonal feeding area, has written permission for the location of the bunks been obtained from the manager?					
Seasonal area access					
27 (a) Is the feeding of livestock, poultry or farmed game in a seasonal feeding area with access to watercourses in accordance with section 26?					
27 (b) Is the access located and maintained as necessary to prevent pollution?					
Confined area access					
28 Is it ensured that livestock, poultry or farmed game in a confined livestock area do not have access to a watercourse, with the exception of a holding area on rangeland where livestock is held no longer than 72 hours, the watercourse is not a source of water used for domestic purposes at any location downstream from the confined livestock area, and the access is located and maintained as necessary to prevent pollution?					
Confined area operation					
29 (1) Are confined livestock areas operated in a way that does not cause pollution?					
29 (2)(a) If there are more than 10 agricultural units (1 unit = 455 kg or 1000 lbs live weight) in a confined livestock area or areas within the same drainage basin is/are the area or areas located at least 30 m from a high tide watermark, a watercourse or the bank of a watercourse? or any source of					

water used for domestic purposes?					
29 (2)(b) If there are more than 10 agricultural units (1 unit = 455 kg or 1000 lbs live weight) in a confined livestock area or areas within the same drainage basin is/are the area or areas located at least 30 m from any source of water used for domestic purposes?					

	In	Out	UD	NA	Comments
29 (3) Subsection (2) does not apply to a permanent confined livestock area constructed prior to April 1, 1992 provided that a report demonstrating to the satisfaction of the manager that no pollution of any watercourse or domestic water supply is occurring from the permanent confined livestock area, produced by a person with professional qualifications in the field of environmental assessment and licensed to practice in British Columbia, or staff of the Ministry of Agriculture, Fisheries and Food under a Best Agricultural Waste Management Plan is completed by April 1, 1993 and is made available to the manager at his or her request.					
PART 10 — USE AND STORAGE OF AGRICULTURAL PRODUCTS					
Agricultural products					
30 Are agricultural products such as livestock, poultry, farmed game, fur bearing animals, animal and poultry feeds, forage silage, forage crops, vegetables and chemical fertilizers managed, used and stored in a manner that prevents the escape of agricultural waste that causes pollution?					
Mushroom or soilless medium					
31 Are raw materials for making products such as mushroom medium or soilless medium used and stored in a manner that prevents the escape of agricultural waste that causes pollution?					

Comments:

Appendix D: Data Spreadsheet

Due to the size of this spreadsheet, it has been placed on the following File Transfer Protocol site:

ftp://ftpsry.env.gov.bc.ca/pub/outgoing/ep/Compliance_Assessments/Ag_Assessment.zip

The ftp address above should be typed into the address bar of your internet browser

Password is manure

Appendix E: Agricultural Waste Control Regulation

B.C. Reg. 131/92
O.C. 557/92

Deposited April 9, 1992

Waste Management Act, Health Act

AGRICULTURAL WASTE CONTROL REGULATION

Contents

Interpretation

1 In this regulation:

"agricultural operation" means any agricultural operation or activity carried out on a farm including

(a) an operation or activity devoted to the production or keeping of livestock, poultry, farmed game, fur bearing animals, crops, grain, vegetables, milk, eggs, honey, mushrooms, horticultural products, tree fruits, berries, and

(b) the operation of machinery and equipment for agricultural waste management or application of fertilizers and soil conditioners;

"Code" means the Code of Agricultural Practice for Waste Management April 1, 1992 attached to this regulation.

Exemptions

2 A person who carries out an agricultural operation in accordance with the Code is, for the purposes of carrying out that agricultural operation, exempt from section 3 (2) and (3) of the *Waste Management Act*.

CODE OF AGRICULTURAL PRACTICE FOR WASTE MANAGEMENT, APRIL 1, 1992

PART 1 — PURPOSE

Purpose

1 The purpose of this Code is to describe practices for using, storing and managing agricultural waste that will result in agricultural waste being handled in an environmentally sound manner.

PART 2 — INTERPRETATION

Interpretation

2 (1) In this Code:

"agricultural unit" means a live weight of 455 kg (1 000 lbs) of livestock, poultry or farmed game or any combination of them that equals 455 kg;

"agricultural waste" includes manure, used mushroom medium and agricultural vegetation waste;

"confined livestock area" means an outdoor, non-grazing area where livestock, poultry or farmed game is confined by fences, other structures or topography including feedlots, paddocks, corrals, exercise yards and holding areas, but not including a seasonal feeding area;

"farmed game" means any animal held under the authority of a licence under the *Game Farm Act*;

"feedlot" means a fenced area where livestock, poultry or farmed game is confined solely for the purpose of growing or finishing and is sustained by means other than grazing;

"field storage" means a temporary stock of agricultural waste ready to be drawn upon for use as a crop fertilizer or soil conditioner;

"grazing area" means a pasture or rangeland where livestock, poultry or farmed game is primarily sustained by direct consumption of feed growing on the area;

"groundwater" means water below the surface of the ground;

"manager" means a person employed by the Crown and designated in writing by the minister as a district director, a regional waste manager or an acting, assistant or deputy regional waste manager;

"mortalities" means livestock, poultry or farmed game that has died and that is unmarketable;

"mushroom medium" means a mixture that is composted and used as a medium for growing mushrooms;

"pollution" means the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment;

"precipitation" means precipitation as determined by the Canadian Atmospheric Environmental Service Reports of Environment Canada;

"seasonal feeding area" means an area

(a) used for forage or other crop production, and

(b) used seasonally for feeding livestock, poultry or farmed game that is primarily sustained by supplemental feed,

but does not include a confined livestock area or grazing area;

"soilless medium" means a material that is manufactured for the growing of plants and may contain natural soils;

"solid agricultural waste" means agricultural waste that

(a) is 20% or more solid matter, and

(b) will not flow when piled;

"storage facility" includes a structure, reservoir, lagoon, cistern, gutter, tank or bermed area for containing agricultural waste prior to its use or disposal, but does not include a vehicle or any mobile equipment used for transportation or disposal of agricultural waste;

"watercourse" means a place that perennially or intermittently contains surface water, including a lake, river, creek, canal, spring, ravine, swamp, salt water marsh or bog, and including a drainage ditch leading into any of the foregoing;

"wood waste" includes hog fuel, mill ends, wood chips, bark and sawdust, but does not include demolition waste, construction waste, tree stumps, branches, logs or log ends.

(2) The definitions of the *Waste Management Act* apply to this Code.

PART 3 — GENERAL

General

3 Agricultural wastes, wood waste and mortalities must be collected, stored, handled, used and disposed of in accordance with this Code and in a manner that prevents pollution.

PART 4 — STORAGE AND USE OF AGRICULTURAL WASTE

Allowable storage

4 Agricultural waste may be stored on a farm only if the waste is produced or used on that farm.

Storage methods

5 When agricultural waste is stored, it must be stored

(a) in a storage facility,

(b) as field storage, or

(c) in the case of waste from fur bearing animals, under their outdoor pens.

Storage facility

6 A storage facility must

(a) be of sufficient capacity to store all the agricultural waste produced or used on the farm for the period of time needed to allow for

(i) the application of agricultural waste as a fertilizer or soil conditioner, or

(ii) the removal of agricultural waste,

(b) prevent the escape of any agricultural waste that causes pollution, and

(c) be maintained in a manner to prevent pollution.

Location of storage facility

7 (1) A storage facility must be located at least 15 m from any watercourse and 30 m from any source of water for domestic purposes.

(2) Subsection (1) does not apply to a storage facility existing prior to April 1, 1992 provided that a report

(a) demonstrating to the satisfaction of the manager that no pollution of any watercourse or domestic water supply is occurring from the storage facility, and

(b) produced by

(i) a person with professional qualifications in the field of environmental assessment and licensed to practice in British Columbia, or

(ii) staff of the Ministry of Agriculture, Fisheries and Food under a Best Agricultural Waste Management Plan

is made available to the manager within 12 months of his or her request.

Field storage

8 (1) Solid agricultural waste may be stored on a field for 2 weeks or less if the agricultural waste is

(a) used within 2 weeks, and

(b) stored in a manner that prevents the escape of agricultural waste that causes pollution.

(2) Solid agricultural waste may be stored on a field for more than 2 weeks if the agricultural waste is

(a) stored for no longer than 9 months,

(b) located at least 30 m from any watercourse or any source of water used for domestic purposes, and

(c) stored in a manner that prevents the escape of agricultural waste that causes pollution.

(3) Berms or other works must be constructed around a field storage area if this is necessary to prevent the escape of agricultural waste that causes pollution.

Rainy season field storage

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.

Under pen storage

10 (1) Agricultural waste from fur bearing animals may be stored under their outdoor pens for up to 9 months if the storage area under the pens

(a) prevents the escape of any agricultural wastes that causes pollution, and

(b) is located at least 15 m from a watercourse and 30 m from any source of water used for domestic purposes.

(2) Subsection (1) (b) does not apply to a pen constructed prior to April 1, 1992 provided that a report

(a) demonstrating to the satisfaction of the manager that no pollution of any watercourse or domestic water supply is occurring from the under pen storage facility, and

(b) produced by

(i) a person with professional qualifications in the field of environmental assessment and licensed to practice in British Columbia, or

(ii) staff of the Ministry of Agriculture, Fisheries and Food under a Best Agricultural Waste Management Plan

is made available to the manager within 12 months of his or her request.

PART 5 — APPLICATION AND COMPOSTING OF AGRICULTURAL WASTE

Discharge to water

11 Agricultural waste must not be directly discharged into a watercourse or groundwater.

Allowable application

12 Agricultural waste must be applied to land only as a fertilizer or a soil conditioner.

Prohibited application

13 Agricultural waste must not be applied to the land if, due to meteorological, topographical or soil conditions or the rate of application, runoff or the escape of agricultural waste causes pollution of a watercourse or groundwater.

Conditions unfavorable to application

14 Agricultural wastes must not be applied

(a) on frozen land,

(b) in diverting winds,

(c) on areas having standing water,

(d) on saturated soils, or

(e) at rates of application that exceed the amount required for crop growth,

if runoff or escape of agricultural waste causes pollution of a watercourse or groundwater, or goes beyond the farm boundary.

Composting

15 Agricultural waste may be composted on a farm if

(a) the agricultural waste being composted consists only of agricultural waste

(i) produced on that farm, or

(ii) produced elsewhere but being composted for use on that farm only,

(b) the composting site is located at least 15 m from a watercourse and 30 m from any source of water used for domestic purposes, and

(c) the agricultural waste is composted in a manner that does not cause pollution.

Composting for mushroom medium

16 (1) Composting agricultural waste for the production of mushroom medium on a farm is allowed if

(a) the mushroom medium produced is used only on that farm,

(b) the composting site is located at least 15 m from a watercourse and 30 m from any source of water used for domestic purposes, and

(c) the medium is composted in a manner that does not cause pollution.

(2) Subsection (1) (a) and (b) does not apply to a composting operation and site existing prior to April 1, 1992 provided that a report

(a) demonstrating to the satisfaction of the manager that no pollution of any watercourse or domestic water supply is occurring from the composting operation and site, and

(b) produced by

(i) a person with professional qualifications in the field of environmental assessment and licensed to practice in British Columbia, or

(ii) staff of the Ministry of Agriculture, Fisheries and Food under a Best Agricultural Waste Management Plan

is completed by April 1, 1993 and is made available to the manager at his or her request.

PART 6 — AGRICULTURAL EMISSIONS

Emissions

17 Emissions from forced air ventilation systems used on a farm must not cause pollution.

Wood fired boilers

18 Emissions from a wood fired boiler must not exceed 180 mg per cubic metre of particulate matter and 20% opacity, except that

(a) for a permanent wood fired boiler installed before April 1, 1992 and not operating under a waste management permit, emissions must not exceed 230 mg per cubic metre of particulate matter and 20% opacity, and

(b) for a permanent wood fired boiler installed before April 1, 1992 and operating under a waste management permit, the emission levels under that permit apply unless those levels are higher than the levels specified in (a).

Odours not prohibited

19 Nothing in this Code is intended to prohibit various odours from agricultural operations or activities on a farm, providing such operations or activities are carried out in accordance with this Code.

PART 7 — STORAGE AND USE OF WOOD WASTE

Allowable use

20 Wood waste may only be used for

(a) plant mulch, soil conditioner, ground cover, on-farm access ways, livestock bedding and areas where livestock, poultry or farmed game are confined or exercised,

(b) berms for cranberry production, or

(c) fuel for wood fired boilers.

Storage

21 Wood waste stored and used on a farm must be handled so as to prevent any escape of

(a) particulate or solid matter from the wood waste into the air, or

(b) particulate or solid matter or leachate from the wood waste into any watercourse or groundwater

that causes pollution.

Prohibited use

22 Wood waste used on the farm must not be used

(a) for landfill, and

(b) on sites within 30 m of any source of water used for domestic purposes with the exception of existing sites under use prior to April 1, 1992, provided that this use is not causing pollution.

PART 8 — ON-FARM DISPOSAL OF MORTALITIES

Burial and incineration

23 (1) Mortalities may be disposed of on-farm by burial or incineration if

(a) the mortalities are livestock, poultry or farmed game disposed of on the farm where they died,

(b) the disposal does not cause pollution,

(c) where disposal is to land, the burial pits are covered, located at least 30 m from any source of water used for domestic purposes and constructed to prevent the escape of any agricultural waste that causes pollution, and

(d) where disposal is by incineration, the emissions from an incinerator do not exceed 180 mg per cubic metre of particulate matter and 20% opacity, except that

(i) for a permanent incinerator installed before April 1, 1992 and not operating under a waste management permit, emissions must not exceed 230 mg per cubic metre of particulate matter and 20% opacity, and

(ii) for a permanent incinerator installed before April 1, 1992 and operating under a waste management permit, the emission levels required by that permit apply unless those levels exceed the levels specified in (i).

Composting

24 Mortalities may be composted on-farm if

(a) the mortalities are composted on the farm where they died,

(b) the composting site is located at least 15 m from a watercourse and 30 m from any source of water used for domestic purposes, and

(c) the composting does not cause pollution.

PART 9 — FEEDING AREAS AND ACCESS TO WATER

Grazing areas

25 Livestock, poultry or farmed game feeding within a grazing area may have access to watercourses, provided that the agricultural waste produced by that livestock, poultry or farmed game does not cause pollution.

Seasonal feeding areas

26 (1) A seasonal feeding area for livestock, poultry or farmed game must

(a) be operated in a way that does not cause pollution, and

(b) have berms where necessary to prevent agricultural waste runoff from causing pollution.

(2) Locations for feeding livestock, poultry or farmed game within a seasonal feeding area, including locations for movable feed bunks, must

(a) be at least 30 m from a high tide watermark, a watercourse or the bank of a watercourse, unless written permission has been obtained from the manager for a closer location, and

(b) be distributed throughout the area to ensure that manure from the feeding of livestock, poultry or farmed game is spread as a fertilizer or soil conditioner and that no accumulation of manure causes pollution.

(3) Where permanent feed bunks are used within a seasonal feeding area, written permission for the location of the bunks must be obtained from the manager.

Seasonal area access

27 Livestock, poultry or farmed game in a seasonal feeding area may have access to watercourses provided that

(a) the feeding of livestock, poultry or farmed game is in accordance with section 26, and

(b) the access is located and maintained as necessary to prevent pollution.

Confined area access

28 Livestock, poultry or farmed game in a confined livestock area may not have access to a watercourse, with the exception of a holding area on rangeland where

(a) livestock is held no longer than 72 hours,

(b) the watercourse is not a source of water used for domestic purposes at any location downstream from the confined livestock area, and

(c) the access is located and maintained as necessary to prevent pollution.

Confined area operation

29 (1) Confined livestock areas must be operated in a way that does not cause pollution.

(2) If there are more than 10 agricultural units in a confined livestock area or areas within the same drainage basin then the area or areas must be located at least 30 m from a high tide watermark, a watercourse, the bank of a watercourse or any source of water used for domestic purposes.

(3) Subsection (2) does not apply to a permanent confined livestock area constructed prior to April 1, 1992 provided that a report

(a) demonstrating to the satisfaction of the manager that no pollution of any watercourse or domestic water supply is occurring from the permanent confined livestock area, and

(b) produced by

(i) a person with professional qualifications in the field of environmental assessment and licensed to practice in British Columbia, or

(ii) staff of the Ministry of Agriculture, Fisheries and Food under a Best Agricultural Waste Management Plan

is completed by April 1, 1993 and is made available to the manager at his or her request.

PART 10 — USE AND STORAGE OF AGRICULTURAL PRODUCTS

Agricultural products

30 Agricultural products such as livestock, poultry, farmed game, fur bearing animals, animal and poultry feeds, forage silage, forage crops, vegetables and chemical fertilizers must be managed, used and stored in a manner that prevents the escape of agricultural waste that causes pollution.

Mushroom or soilless medium

31 Raw materials for making products such as mushroom medium or soilless medium must be used and stored in a manner that prevents the escape of agricultural waste that causes pollution.

[Provisions relevant to the enactment of this regulation: section 57 (3) (k) of the *Waste Management Act,* R.S.B.C. 1996, c. 482 and section 8 of the *Health Act,* R.S.B.C. 1996, c. 179]

Appendix F: MAFF Fact Sheets

Field Storage of Solid Agricultural Waste (covering manure piles) available at:
http://www.agf.gov.bc.ca/resmgmt/publist/300series/383100-3.pdf

Environmentally Friendly Horse Farm Through Better Manure/Waste Management available at:
http://www.agf.gov.bc.ca/resmgmt/publist/300series/386000-8.pdf

Sizing Dairy Manure Storage Facilities available at:
http://www.agf.gov.bc.ca/resmgmt/publist/300series/383100%2D2.pdf

Manure Storage Structures available at:
http://www.agf.gov.bc.ca/resmgmt/publist/300series/383000-1.pdf