FRASER RIVER ACTION PLAN

Report on Abatement Activities Related to Agriculture and Waste Management in the Lower Fraser Valley

DOE FRAP 1997- 45

Environment Canada Environnement Canada

BC Environment

Report on Abatement Activities Related to Agriculture and Waste Management in the Lower Fraser Valley

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DOE FRAP 1997-45

March 1998

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SUMMARY

In the order of 900 agricultural complaints have been responded to since the Agricultural Waste Control Regulation and associated Code was introduced in 1992. The files have been entered into a regional database and can be reviewed by commodity, type of problem and geographic area. The results indicated that the majority of problems were caused by a large number of farms experiencing a wide variety of waste management problems versus recurring concerns at a small number of farms. There is some suggestion that the number of complaints related to manure piles and storage are decreasing and especially over the Abbotsford aquifer. However, there appears to be an increasing trend with respect to complaints related to manure application.

A 1994 farm survey in two Lower Fraser valley watersheds indicated that a large proportion of dairy farms (~45%) had limited manure storage capacity of less than 3 months. Winter time manure disposal is an ongoing concern and has been initially addressed through the development of Manure Management Guidelines for the Lower Fraser Valley.

The self-regulatory or peer advisor process envisioned at the time the Code was introduced has been an evolving process. Several factors including uncertainty over the role of advisors versus MELP, shortage of advisors, varying degrees of commodity support and limited environmental training appear to be some of the obstacles limiting the process. An informal referral process between MELP and a few municipalities has been useful as a pollution prevention tool by addressing potential problems at the building permit stage, but is limited by available resources.

Water quality monitoring of a number of Lower Fraser Valley watercourses has demonstrated the connection between rainfall and elevated nitrate levels, especially in the early autumn period. Monitoring has also demonstrated there are reduced dissolved oxygen levels in a number of low-land, flood-gated streams traversing agricultural areas.

RÉSUMÉ

Depuis l'entrée en vigueur en 1992 du règlement sur le contrôle des déchets agricoles et de son code, on a répondu à environ 900 plaintes de nature agricole. Les dossiers ont été entrés dans une base de données régionale et ils peuvent être examinés par produit, par type de problème et par zone géographique. Les résultats ont montré que presque tous les problèmes étaient attribuables à un grand nombre d'exploitations agricoles exposées à divers problèmes de gestion des déchets par opposition à des problèmes répétitifs dans un petit nombre d'exploitations agricoles. Il semble que le nombre de plaintes liées aux tas de fumier et à leur entreposage tend à diminuer et, plus particulièrement, au niveau de l'aquifère d'Abbotsford. Toutefois, les plaintes liées à l'application du fumier seraient à la hausse.

Une enquête sur les fermes menée en 1994 dans deux bassins hydrographiques de la vallée du cours inférieur du Fraser a montré que la capacité d'entreposage du fumier dans une forte proportion des fermes laitières (environ 45 %) était inférieure à trois mois. L'évacuation du fumier en hiver est un sujet de préoccupation constant; à l'origine, on a tenté de régler ce problème par l'élaboration de lignes directrices sur la gestion du fumier dans la vallée du cours inférieur du Fraser.

Le processus d'autoréglementation ou de consultation des pairs envisagé au moment où le Code a été implanté a été un processus évolutif. Plusieurs facteurs, notamment l'incertitude concernant le rôle des conseillers par opposition à celui du MELP, la pénurie de conseillers, les degrés variables de soutien offert aux différentes catégories de producteurs et la formation réduite en environnement, semblent représenter des obstacles limitants du processus. Un processus officieux de consultation entre le MELP et quelques municipalités a permis en partie de lutter contre la pollution puisqu'il a réglé des problèmes potentiels au niveau des permis de construction, mais il est limité par les ressources disponibles.

La surveillance de la qualité de l'eau de plusieurs cours d'eau de la vallée du cours inférieur du Fraser a montré le lien entre les précipitations et les concentrations élevées de nitrates, en particulier au début de l'automne. La surveillance a également révélé une concentration réduite d'oxygène dissous dans certains cours d'eau à débit régularisé par un système de vannes qui traversent des zones agricoles situées sur des basses terres.

1.0 INTRODUCTION

The Lower Fraser Valley (LFV), a rolling to flat lowland area, stretches approximately 145 kilometers along the Fraser River from Vancouver to Hope. Bounded to the west by Georgia Strait, the US/Canada border to the south, with the Coast and Cascade Mountains forming the north and southeast boundaries, the Valley is a distinct geographic area (Figure 1).

The Fraser River and tributary streams drain most of the Valley in a westerly direction. The Serpentine, Nicomekl and Campbell River watersheds flow mainly in a southwesterly direction to Boundary Bay. The area south and southwest of Abbotsford drains southward across the US - Canada border via Bertrand, Pepin and Fishtrap Creeks. The valley provides a network of streams and habitat crucial to the survival of salmonids and other fish populations (DFO, 1989 and 1990), wetlands for a variety of water fowl, amphibians and other wildlife (Canadian Wildlife Service, 1990) and water for agricultural irrigation. The network of watercourses is underlain by numerous groundwater aquifers (Figure 2). Protecting the environmental quality of this network of streams, wetlands and aquifers can be accomplished through a combination of stewardship action, implementation of environmental regulations and the adoption of new regulations, if necessary. This report largely addresses some of the recent regulatory aspects of environmental protection related to agriculture in the LFV.

1.1 Agricultural Land Reserve and Land Use in the Lower Fraser Valley

With favorable climatic conditions, highly productive soils, flat topography and the ability to produce a wide range of crops, the LFV is British Columbia's most concentrated farming region. It is described as some of Canada's most productive and profitable agricultural lands (Sands, 1991). Within this region, a wide variety of agricultural production occurs and includes all types of livestock and poultry, fur bearing animals, greenhouse operations, mushroom operations, and nursery, berry and vegetable production. Although the LFV includes only 3% of the Agricultural Land Reserve (ALR), or about 135,000 ha, over 50% of the provincial $1.5 billion dollar farm gate receipts are generated in this area.

The Agricultural Land Reserve was established in 1974 to preserve and protect agricultural lands from development (Canadian Wildlife Service, 1990). Between 1974 and 1987, ALR land in the LFV had a net decline of 5.5% or approximately 620 ha/year. BCCWS, 1990 reported that between 1980 and 1987 alone, there was a net decline of 3,604 ha and applications for further withdrawals continue to be filed. As well, the trend towards the conversion of agricultural land for other purposes such as golf courses and turf farms results in less available land for manure waste management and can result in smaller land holdings. Once established, golf courses are unlikely to revert back to agricultural production. Continued application for withdrawals of land from the ALR is likely. With urban development at its fringe the ALR is under considerable pressure.

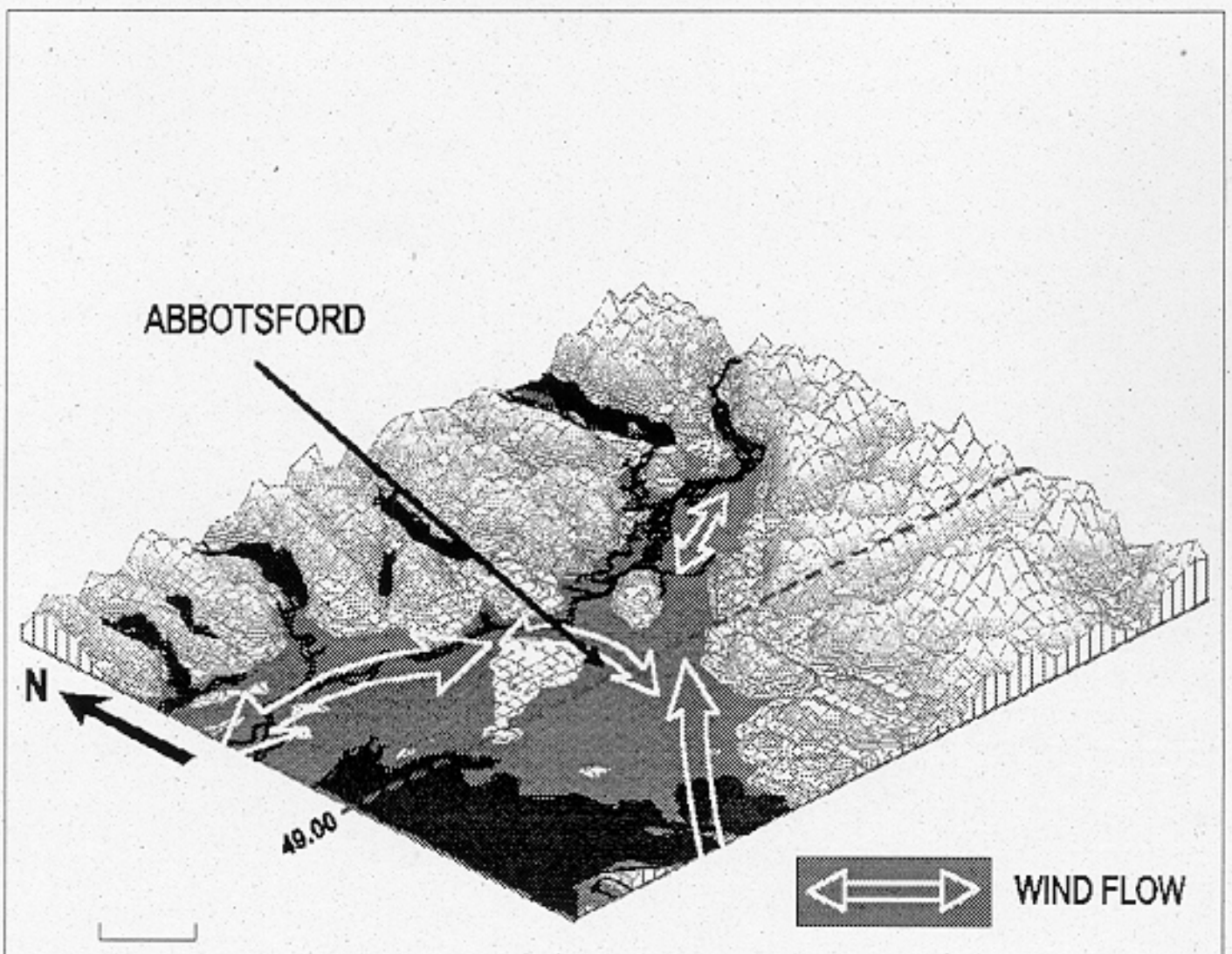


Figure 1 : Lower Fraser Valley Geographic Features (Source: EC-AES, W. Belzer)

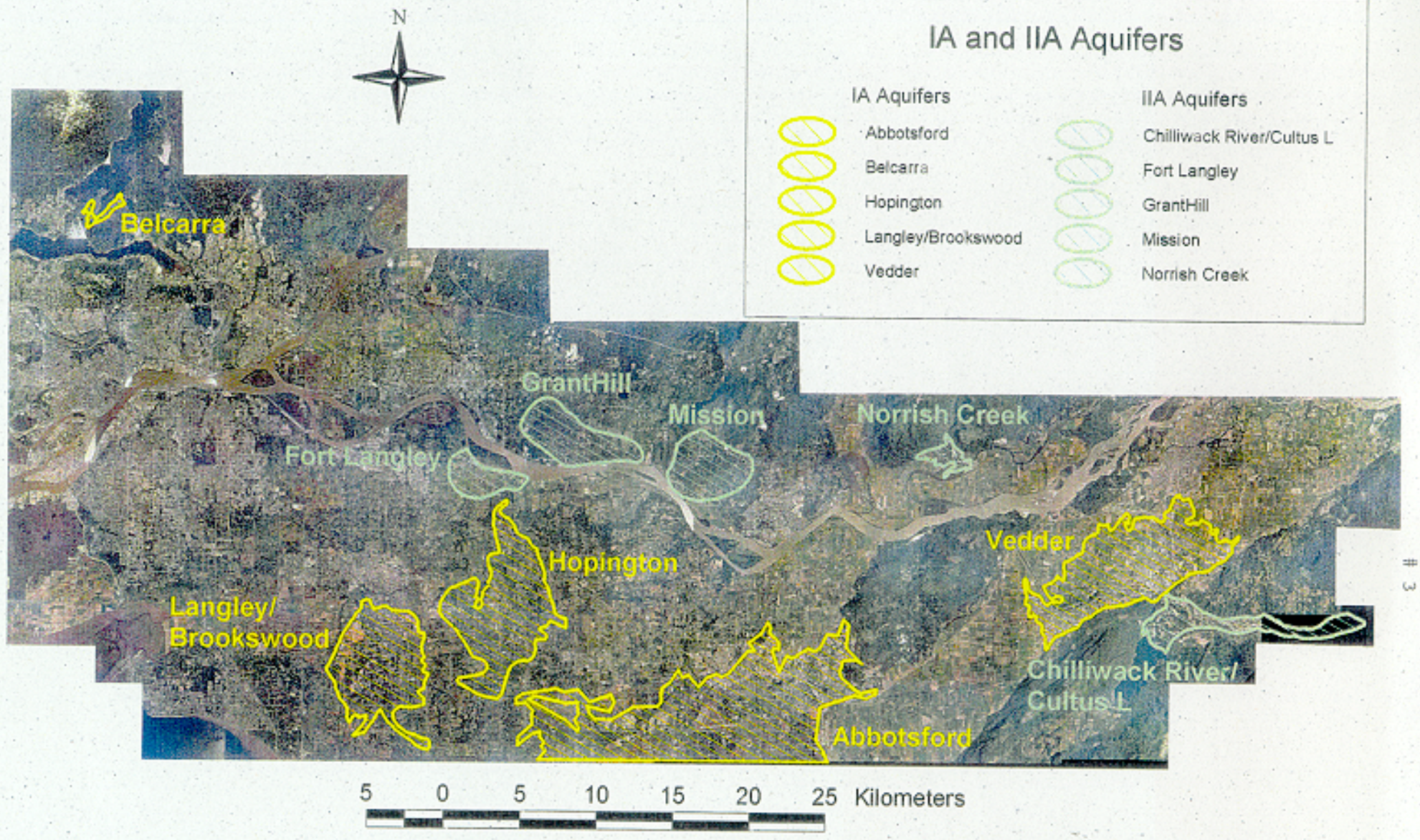


Figure 2 Lower Fraser Valley Class IA and IIA Aquifers

E-CARTA Services

Digital Orthophoto by:
Triathlon Mapping

Conflicts between urban and farm uses include complaints of vandalism, traffic, odour, and noise. As a result of such complaints, some local governments have responded by implementing restrictive bylaws against "traditional" farming practices. An example is the new bylaw[1] passed in 1997 by the Township of Langley which placed a moratorium on the expansion of mushroom growing operations. In order to protect agriculture from unwarranted nuisance suits and subsequent bylaws, B.C. has developed "Right to Farm" legislation (Farm Practices Act, 1995).

1.2 Agricultural Production in the Lower Fraser Valley

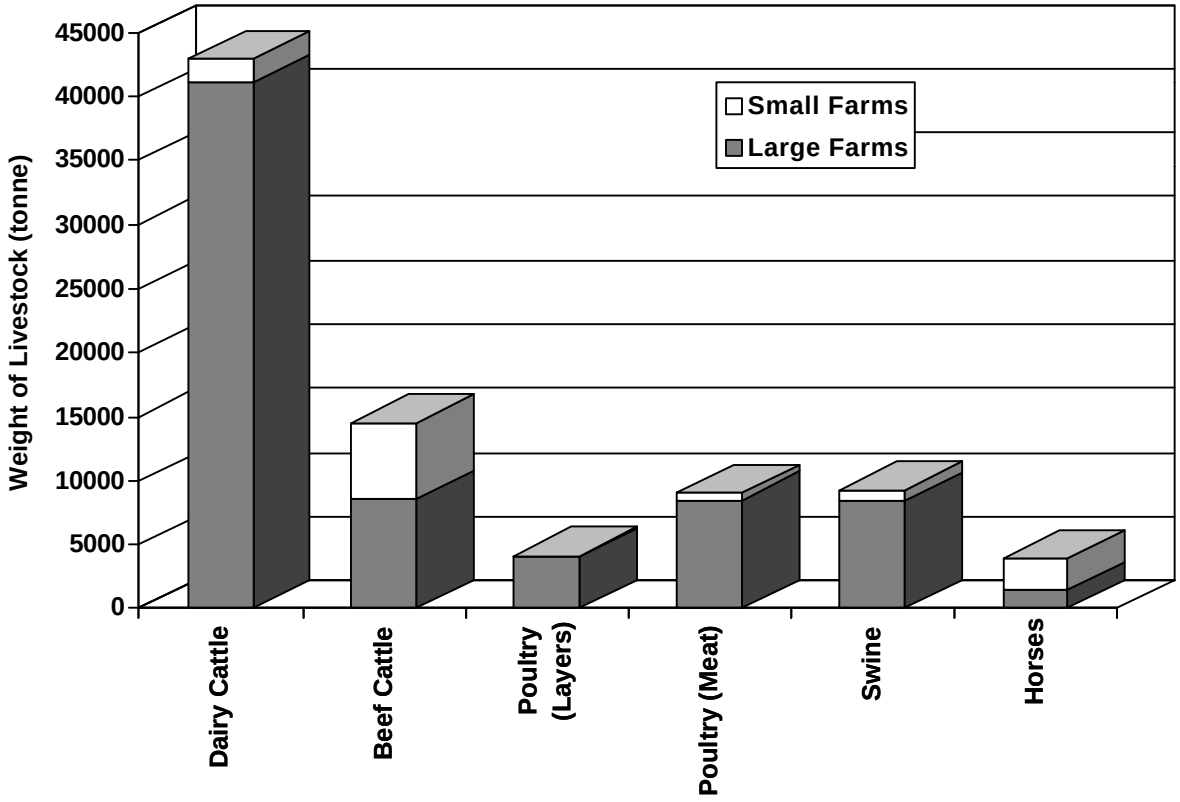
Inherent with animal production is the generation of large amounts of "agricultural waste" which includes manure. For example, an average dairy cow produces 60 L/d, a finisher pig 8.6 L/d and a layer chicken 0.91 L/week of waste. The distribution of livestock in the Lower Fraser Valley by total mass is shown on Figure 3. The costs of handling, storage, treatment and spreading are essential elements of the overall cost of animal production. Intensive agriculture in the LFV has resulted in areas where the generation of manure nutrients is more than there is land available to effectively use it. Changes in the type of animal production, combined with changes in the type of cropping have, over time, resulted in the increasing nitrogen surplus. For example, the surplus amount of nitrogen relative to that needed for crop production over the Abbotsford aquifer increased progressively from approximately 200 kg N/ha in 1971 to 330 kg N/ha in 1991 (Figure 4) (Zebarth and Paul, 1995).

The BC Ministry of Agriculture, Fisheries & Food (MAFF, 1994) reported that the economic pressures faced by BC producers are not only because of trade agreements such as the General Agreement on Trade and Tariffs (GATT) and North American Free Trade Agreement (NAFTA) but, also due to consumers who believe that "the grass is greener on the other side". Consumers do not want to be restricted to locally produced products. MAFF also points out that society is raising ethical, environmental and health concerns regarding the technology and waste management practices being used by the agricultural industry. While these practices have yielded increased productivity over the years, in many cases the environmental impacts may not have been factored into the overall cost of operation. The introduction of waste management regulations plus restrictions and improvements on land use are now having to be addressed. MAFF reported that these combined challenges are making it difficult for the smaller, family operated farms with limited resources to remain viable.

A large number of farms are situated in the Lower Fraser Valley. Wohl, 1997 reported that at the time of the 1991 Census of Agriculture in the Lower Fraser Valley, there were 3,587 small farms (annual gross farm receipts less than $40,000) and 1,955 large

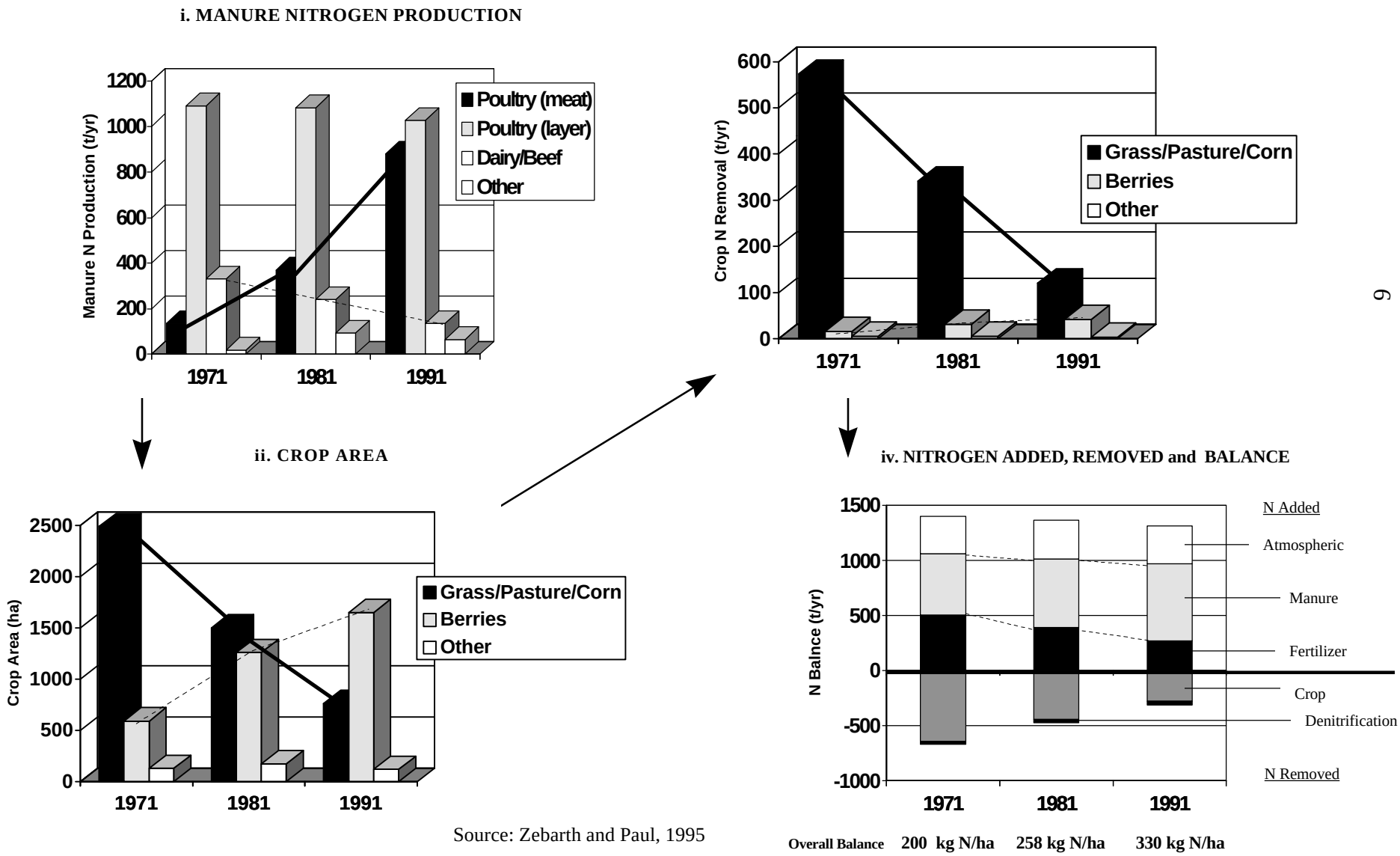
[1] Bylaw No. 3739 amends the Township of Langley Zoning Bylaw text by adding provisions to regulate the location, siting, operations and building application relating to mushroom farming.

Figure 3 : Weight of Livestock Distributed in Lower Fraser Valley - 1991



Source: Brisbin, 1994

Figure 4 : Changes in Nitrogen Balance Over Time With Changes in Land Use and Animal Production - Abbotsford Aquifer



Source: Zebarth and Paul, 1995

farms (farms with annual gross receipts greater than $40,000). Several studies which addressed the economic feasibility of various manure management options were reviewed by Wohl. The financial feasibility of the different manure management options varied from one farm to the other, depending on the type of farm, size of farm and the availability of pasture land. For example, a 100-cow dairy operation with 50% land cultivated and 50% of the land set aside for forage crops, with a six month uncovered concrete manure pit and no liquid-solid separator, had a net annual expense of $30,000 related strictly to manure handling.

Wohl addressed the social costs of waste management options and reported that although the qualitative nature of the social costs made those costs difficult to estimate, the studies cited indicated that the social costs of current agricultural waste management practices were likely substantial.

1.2.1 Water Quality Issues

Pollution problems are more likely to occur at farms with a small land base relative to unit animal production, coupled with poor agricultural waste management practices. Water quality surveys and studies have demonstrated that water quality throughout the LFV is being impacted from agriculture to varying degrees. Contamination of groundwater and surface water from agricultural wastes and runoff occurs from practices and/or sources such as insufficient storage, uncovered manure piles during the rainy season, poor manure spreading practices, woodwaste use, silage and milk parlour discharges. Hutton, 1987 reported that the land base for dairy manure (not based on crop nitrogen requirements) disposal needs in the Sumas River watershed resulted in a surplus of about 300 acres (121 hectares). However, the land base shortfall for hog manure disposal was estimated to be about 1300 acres (526 hectares), for an overall shortfall of almost 1000 acres (405 hectares) of available land for manure disposal. The study revealed that approximately 50% of the hog farms relied to some extent on off-farm disposal, arranged through loose agreements with neighbouring land owners. It appeared that much of the landbase was receiving more manure waste than the land could assimilate. In a recent study which looked at 1991 farm census information, farm practices and commercial fertilizer use, it was reported that for large farms, the nitrogen balance after accounting for crop removal in the Sumas River watershed was 136 kg N/ha/yr (Brisbin, 1995).

Agricultural operations that do not have effective nutrient management plans have the potential to create major impacts on surface water and groundwater quality. Agricultural wastes are potential sources of ammonia, nitrate, organic nitrogen, organic carbon, phosphorus and bacterial contamination. Moore, 1989 indicated that even very small or intermittent contaminated runoff flows could collect in slow-moving ditches or streams and deliver a major contaminant slug of wastewater to streams during heavy rains. Contaminants in the runoff can be highly concentrated and can cause water quality problems even when significant dilution occurs. In many cases, more than one farm may be discharging to a creek system resulting in cumulative impacts. Top et al., 1997 concluded that if all producers in the Matsqui Slough system were to comply with the Code (AWCR,

1992) water quality would likely improve. However, additional measures, such as re-establishing vegetated riparian buffer zones along streams and ditches, would also likely be necessary to minimize contaminant loading to these systems in order to protect coho salmon. Top et al., 1997 indicated that depressed oxygen concentrations (e.g less than 80% saturation) presented the greatest concern and resulted directly from inputs of BOD_5 associated with manure runoff into watercourses and indirectly from eutrophication resulting from nutrient inputs.

2.0 BACKGROUND TO THE AGRICULTURAL COMPLAINT RESPONSE SYSTEM

Prior to the Agricultural Waste Control Regulation (AWCR, 1992) and it's companion, the Code of Agricultural Practice for Waste Management (the Code), discharges of wastes from traditional agricultural operations were exempted, under Section 11 of the Waste Management Act, from the requirement to apply for a permit for disposal of agricultural wastes. At that time the Agricultural Exemption was defined as follows:

> "all discharges of plant and animal waste emanating from **traditional** farming operations which are managed and applied in a **reasonable** manner as organic fertilizers to promote crop production, and all discharges or emissions into the air from traditional farming operations."

The administration of this section in a consistent manner, without sufficient legislative guidance and interpretation of what "traditional" was and what "reasonable" was, proved to be difficult. This led to a range of conflicts when trying to address farming practices that caused pollution. The interpretation of "reasonable" varied substantially between parties.

Initially, the BC Federation of Agriculture (BCFA) formed the Agricultural Environmental Protection Council (AEPC)[2]. The AEPC evolved out of the Agricultural Environmental Service (AES) Program which had its beginnings in the Poultry Sanitation Committee that was formed in the early 1900's. The AEPC, upon its initiation was made up of a broad group of agricultural commodities as well the Ministries of Environment, Lands and Parks and Agriculture, Fisheries and Foods. The Department of Fisheries and Oceans, Ministry of Health and local government were subsequently invited to observe status.

The purpose of AEPC was to foster a high level of environmental integrity on participating farms and ranches in BC It was felt that a meaningful, well run, self-regulated program would likely be sufficient to meet public and government requirements. At the time the AEPC was formed, the province was developing the Agricultural Waste Control Regulation and Code to manage agricultural environmental issues.

[2] BCFA has been disbanded and replaced by the BC Agricultural Council in 1997. In conjunction with this the AEPC became a separate entity and is now called the Agricultural Protection Advisory Service.

2.1 Agricultural Waste Control Regulation and the Code

Under the Agricultural Waste Control Regulation 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 Sections 3(2) and 3(3) (revised RS 1996, c.482) of the Waste Management Act. Those sections address the requirement of holding a waste discharge permit or approval under the act and which would not be necessary, provided the Code was complied with.

The primary purpose of the Code was to specify proper farm management practices that prevented pollution. It addressed methods for storage and use of agricultural wastes (e.g. manure, used mushroom medium and vegetation waste), agricultural emissions, storage and use of woodwaste, on-farm disposal of mortalities, feeding areas and access to water and the use and storage of agricultural products. Specifically, all agricultural wastes were to be managed so that they did not cause pollution. It was intended that the Code be delivered largely through a self-regulated program lead by the AEPC, where peer advisors provided direction to producers with problems. The role of AEPC in implementing a self-regulatory program has been an evolving process, as has the regulatory implementation of the Code.

2.2 Environmental Guidelines for Producers

The Ministry of Agriculture, Fisheries and Food (MAFF), in cooperation with the BCFA and its member organizations took the lead role in developing a set of environmental guidelines for the various commodities (e.g. MAFF, 1993). The guidelines described environmentally sound management practices that would assist the producer in evaluating their own practices and which, if implemented, would comply with the Code. If necessary, producers were expected to voluntarily adopt practices set out in the guidelines which allowed them to operate in an environmentally sustainable manner and thereby, not be subject to permitting under the Waste Management Act (WMA).

2.3 Best Agricultural Waste Management Plans (BAWMPs)

Prior to June 1, 1993, MAFF's Resource Branch provided a free service that made waste management recommendations to producers who had pollution problems. To obtain a BAWMP, the producer initially contacted the local District Agriculturalist or MAFF. After a site visit, a written report was sent to the producer with specific recommendations that needed to be corrected to bring the producer into compliance with the Code. The process was completely confidential. Subsequently, private consultants have been trained by MAFF to develop BAWMPs. The cost of a voluntary BAWMP has been an issue and more than a producer may be willing to pay. In the more serious situations, MELP may order a producer to have a BAWMP developed.

3.0 AGRICULTURAL PRACTICES ASSESSMENT INITIATIVE

An increase in agricultural waste related complaints received by MELP pointed to a trend where an increasing number of significant agricultural waste impacts continued to occur throughout the year. The complaints received may only represent a small portion of the overall number of agricultural waste problems that existed. A more proactive field presence to agricultural waste management was required in order to better define the extent of the numerous impacts identified in various agricultural watersheds. At that time, a component of the Fraser River Action Plan was being developed to address a need to reduce the loading of pollutants to ground water and surface water from agriculture (FRAP, 1992). This included the identification of sources and the development and implementation of suitable prevention measures. MELP's Lower Mainland regional office, with FRAP support, initiated a program to address agricultural waste management issues. The initiative focused on activities which would help describe the overall extent of the problem as well as track the type and number of problems in the Lower Fraser Valley.

3.1 Watershed Farm Practices Study

It was recognized that it was not practical to survey farm practices on all of the farms in the LFV. Through FRAP, an initial study was conducted in 1994 which focused on the Sumas River and Matsqui Slough watersheds (IRC, 1994a and 1994b). Farm participation was strictly voluntary. The study indicated several major areas of concern. Specifically, that there appeared to be a wide range in the manure storage capacity between farms (e.g dairy farms, Figure 5) and some farms had high animal stocking densities (e.g. dairy farms, Figure 6). Farms with a limited manure storage capacity, with high animal numbers on a limited land base and with poorly constructed or sited earthen lagoons, posed the highest risk of polluting the environment. Specific on-farm activities such as manure pile covering, manure handling, silage runoff, milk parlour discharge, excessive woodwaste use and yard runoff, had the potential to contribute to contamination of water resources. A periodic assessment of the farms in the two watersheds was considered as a way to determine whether progress was being made in terms of on-farm practices.

An interesting component of the study was the development of a farm rating system for comparing the "potential" for the contamination of surface water and groundwater from agricultural operations. By using a ranking system the information from individual farm questionnaires and site visits was used to develop a single score called an Environmental Sustainability Parameter (ESP). An ESP score of 80 to 100 was considered to indicate that the farm was likely being managed in an environmentally sensitive manner. While a relationship between the ESP scores and "actual" environmental contamination wasn't established, the system was useful in identifying specific areas that needed to be addressed on a farm (e.g. silage runoff, milk parlour waste disposal).

The survey found that out of the 107 dairy operations in the Sumas watershed, 7 farms had ESP scores greater than 80 (7%) and 4 farms (4%) had ESP scores lower than 40. The median ESP score was 64. Of the 37 dairy operations surveyed on the Matsqui

Figure 5 : Agricultural Survey of Matsqui Slough and Sumas River Watersheds - 1994 Dairy Farm Manure Storage

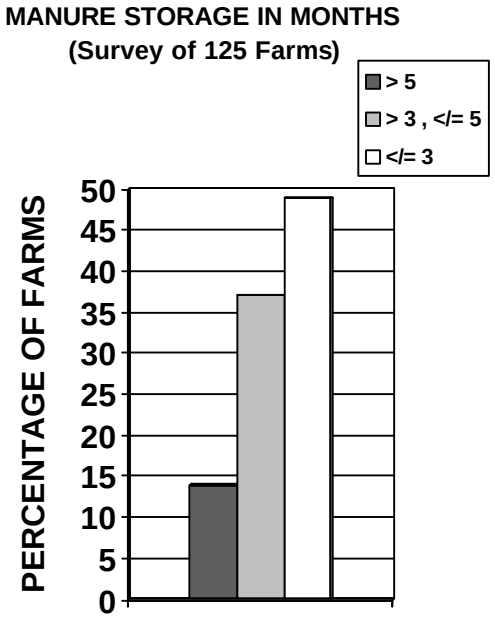


Figure 6 : Agricultural Survey of Matsqui Slough and Sumas River Watersheds - 1994 Dairy Farm Milk Cow Equivalents

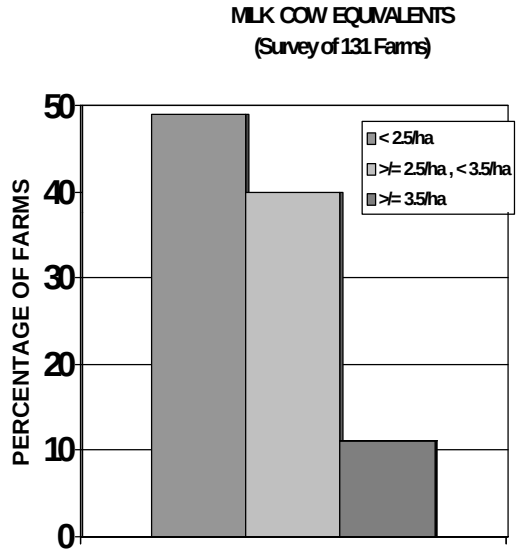
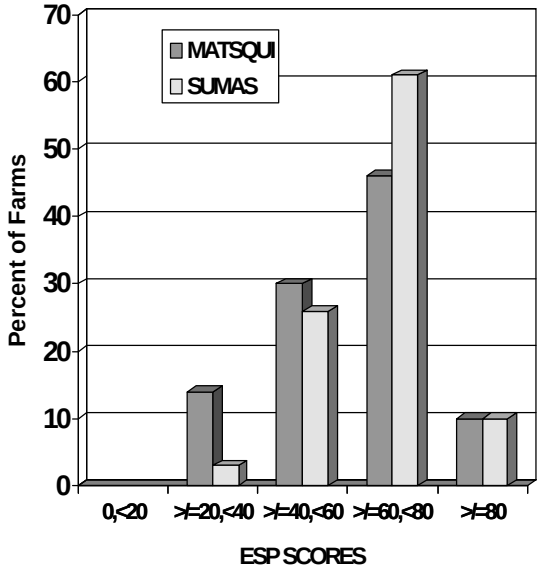


Figure 7 : Agricultural Survey of Matsqui Slough and Sumas River Watersheds - 1994 Dairy Farm ESP Score

(SURVEY OF 131 FARMS)



Slough Watershed, 10 (27%) of the dairy operations had ESP scores greater than 80 and 11 (30%) had ESP scores less than 40 (Figure 7).

3.2 Ongoing Farm Practices Evaluation

3.2.1 Follow-up to Watershed Study

Subsequent to the survey mentioned in Section 3.1, all of the participating farms were sent a letter identifying their individual ESP score and a brochure describing the results of the study. As well, areas where they needed to make improvements were identified. Information was also passed on to the peer advisory service to address some of the more obvious concerns (e.g milk parlour disposal). However, the peer advisory service indicated it was not capable of addressing the large number of concerns at that time. MELP has since addressed a number of these issues in their routine evaluation of farm practices.

Inventories conducted by MELP and contractors (e.g. IRC, 1994a and Hutton, 1987) have identified that many environmental problems are not identified through the complaint process. The complaint resolution system may only be dealing with a small proportion of the agricultural waste impacts. The only protection afforded the environment in many cases is the producer's personal awareness and stewardship ethics.

3.2.2 Tracking Lower Fraser Valley Complaints

A primary objective of this ongoing effort which started in 1994/95 was to critically assess the effectiveness and delivery of the Code. This was done largely through the development of an information base on the nature of the complaints, the location in the LFV and whether it was resolved. In order to be compatible with geographic boundaries established in other studies, the same 20 agricultural waste management zones (e.g. Brisbin, 1995) were used to summarize information related to agricultural waste problems in the Lower Fraser Valley (Figure 8). The effectiveness of the complaint resolution system, the magnitude of the agricultural waste issue and the roles of the agencies involved were to be considered. A model complaint management process is outlined in Figure 9 and involved the establishment of a database to track activities through the complaint resolution system.

3.2.2.1 Database Development

The complaints were entered into a database set up for the following purposes: (1) To allow user friendly access to identify agricultural waste complaints by farm activity, commodity group, watershed and waste zone, (2) To generate reports in a format which would best suit the agricultural complaint system and (3) To allow specific data to be extracted when necessary (e.g. commodity, complainant and/or producer name, zone, watershed and impact) to prepare status reports describing types and number of complaints on an annual basis.

Figure 8 : Twenty Agricultural Waste Management Zones Used in the Management of Agricultrural Wastes in the Lower Fraser Valley Program

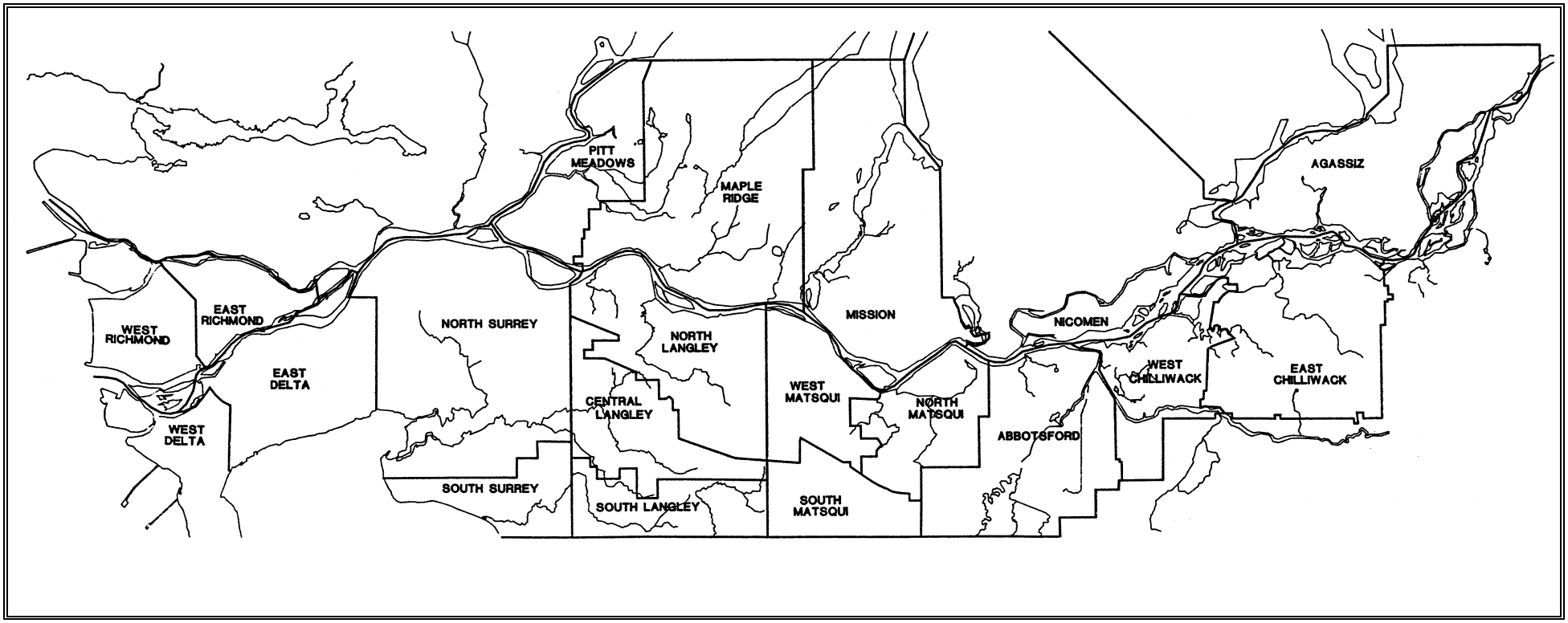
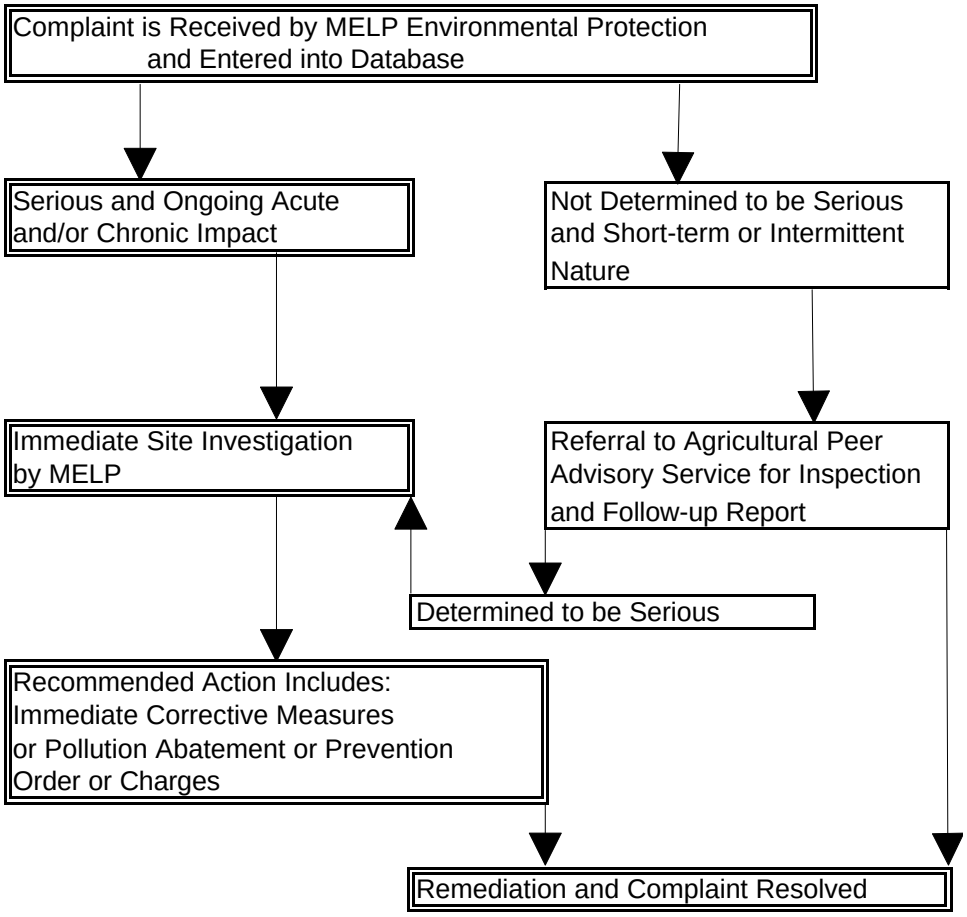


Figure 9 : Model Agricultural Waste Complaint Management Process



3.2.2.2 Types of Complaints

Contamination of ground and surface water from agricultural runoff may occur as the result of factors such as insufficient storage, uncovered manure piles, poor manure handling practices, woodwaste use, silage and milk parlour discharges. During the high rainfall (high risk) periods, nutrients and other contaminants contained in runoff from manured fields (Plates 1 and 2) and uncovered manure piles (Plates 3 and 4) can enter surface waters and leach into groundwater. This is a major, ongoing issue for MELP.

The impact from agricultural waste runoff exerts itself on the fisheries resource in two main ways - by chronically damaging the fisheries resource through reduced water quality causing eutrophication, and/or by causing an immediate acute impact. An example of an acute impact occurred in the Gifford Slough system (West Matsqui Zone, see Figure 8). A hog farmer saturated his small field with hog manure, the runoff entered McLennan Creek and caused a fish kill. The hog farmer in question had a history of poor manure disposal practices, adversely impacting McLennan Creek. Because acute impacts are by definition relatively short-term, they may go unnoticed. However, their recurrence can impact significantly on a stream's fisheries resource.

The environmental impacts caused by poor manure storage practices is illustrated in an occurrence of pollution on a nursery in South Langley. A small hobby farm next to a nursery had stockpiled approximately 30 truckloads of poultry litter (manure/woodwaste mixture) adjacent to a pond which emptied into a larger duck/fish pond situated on nursery property (Plates 5 and 6). The leachate escaping from the manure stockpile gave the water in the ponds a dark, iridescent appearance. Results from the water chemistry samples showed extremely elevated levels of metals, acidity @ pH 8.3, chemical oxygen demand, ammonia, fecal coliform and enterococcus compared to Canadian Drinking Water Guidelines (Table 1). The pond drained to the Campbell River, a major salmon spawning system. At the onset of a heavy precipitation period, this contaminated runoff likely resulted in a major "slug" of potentially toxic wastewater into the Campbell River system.

3.2.3 Awareness and Education

Part of MELP's role has included an ongoing environmental and regulatory awareness component to educate the farming community. This was achieved through Commodity Trade Shows, making presentations at various Association and agency meetings, assisting with the training of Peer Advisors, newspaper articles outlining manure management requirements, and onsite education during the resolution of a complaint.

Plate 1 (left): Contaminated Runoff from Harvested Corn Field Enters Watercourse via Field Drain Tile.

Plate 2 (below): Late Fall Manure Application to Watercourse's Edge Creates a Higher Risk of Contaminated Runoff Entering Salmon Bearing Streams

Plate 3: Uncovered Poultry Manure Stored Near a Wetland and Leaching into Groundwater

Plate 4: Covered Manure Piles Require Checking to Ensure the Cover Remains Intact Over the Winter.

Plate 5: Deposition of Poultry Manure/Woodwaste Mixture Leaches into Watercourse

Plate 6: Leachate Associated Iridescent Film Appearance on Contaminated Pond

Table 1 : Poultry Litter Leachate Contaminated Pond Water		
	Water Quality Objectives Sampling - September, 1992	
Parameter	Contaminated Pond Water Sampling Results (mg/L)	B.C. Water Quality Criteria for Aquatic Life (mg/L)
pH	8	7
Acidity pH @ 8.3	21.6	15
Total Ammonia (N), dissolved	24.1	5.68
Calcium	51.3	6
Iron	3.63	0.3
Potassium	43.1	20
Manganese	1.09	1.0 *
Phosphorus	6.74	0.015
Coliform - Fecal (CFU/100 mL)	710	< 4
Enterococcus (CFU/100 mL)	29000	< 4
* 1.0 mg/L - maximum allowable		

3.2.4 Supporting Water Quality Studies

In order to establish a larger database of surface water quality information to monitor temporal variations in largely agricultural watersheds, the monitoring reported on by IRC, 1994(a) was continued on an annual basis in the fall and spring (Top et al., 1997). The study area was expanded to include additional sites in other watersheds. While a quick response to changes in agricultural practices was not expected, some water quality indicators (e.g. nitrate, dissolved oxygen) could help in identifying improvements over the long-term.

4.0 PROGRAM RESULTS AND DISCUSSION

4.1 Watershed Farm Practices Repeat Study

The second watershed farm practices survey was in progress during preparation of this report and the survey results will be published separately by Environment Canada as part of FRAP. The 1997 survey was a joint initiative with the South Coastal Dairy Education Association through the Dairy Producers' Conservation Group.

4.2 Ongoing Farm Practices Evaluation

Since the Code came into effect in April, 1992, in the Lower Mainland, MELP responded to over 900 agricultural waste related complaints. It was found that the majority of problems were caused by a large number of farms experiencing a wide variety of waste management problems rather than recurring concerns at a small number of farms.

The high number of complaints received each year indicate that the general public may be becoming more aware of the environmental problems associated with poor farm management practices. The Chilliwack Progress newspaper recently ran a three part series on agricultural waste management and the problems associated with runoff to surface waters, and leaching to groundwater from manured fields and poorly stored manure (April 1, 4 and 8, 1997 issues). A similar article run by the Seattle Post, Washington State (November 25, 1996) showed that this is not just a local problem. A recent article in the Capital Press (December 26, 1997), an agriculture weekly serving farms and ranches in Oregon, Washington, Idaho, and California, reported that a Skagit County dairyman was sentenced to a 4 day jail term and fined $40,000 for violating the state's Water Pollution Control Act. Articles such as these are examples of the type of media coverage agriculture has been receiving.

Increased awareness plus the fact that more housing is being built in the LFV along the ALR fringe, will likely result in more observations and reporting of environmental problems in agricultural areas.

4.2.1 Sources and Commodities

A breakdown by commodity of the complaints dealing with agricultural waste management in the 20 agricultural zones, since the inception of the Code, is shown on Figure 10. The majority of files are concentrated in the Abbotsford, Matsqui and Langley areas. The commodities and number of complaints largely reflect the demographics of agriculture in the LFV. The majority of poultry complaints occur within the Matsqui and Langley zones. Dairy complaints are dispersed throughout the Valley from Delta east. Horse complaints occur primarily in the Langley and Maple Ridge areas, and mushroom complaints are mainly in the Langley, Surrey and Abbotsford areas.

A breakdown by complaint type for the Lower Fraser valley is shown on Figure 11. The majority of complaints concern manure piles and the application of manure to land. This likely reflects the visibility of these practices. It is easy to spot an uncovered manure pile or a producer spreading manure. Contamination from runoff sources is also significant and can occur as a direct discharge into the environment from feedlots, solid manure and silage storage areas, manured fields, milk parlours, mushroom farms, greenhouses and nurseries. Other sources of contaminants include manure pits and lagoons, discharges of leachate from woodwastes, improper disposal of mortalities and pesticide application and storage activities.

Figure 10: Agricultural Compliants by Commodity in the Lower Fraser Valley 1992-1998

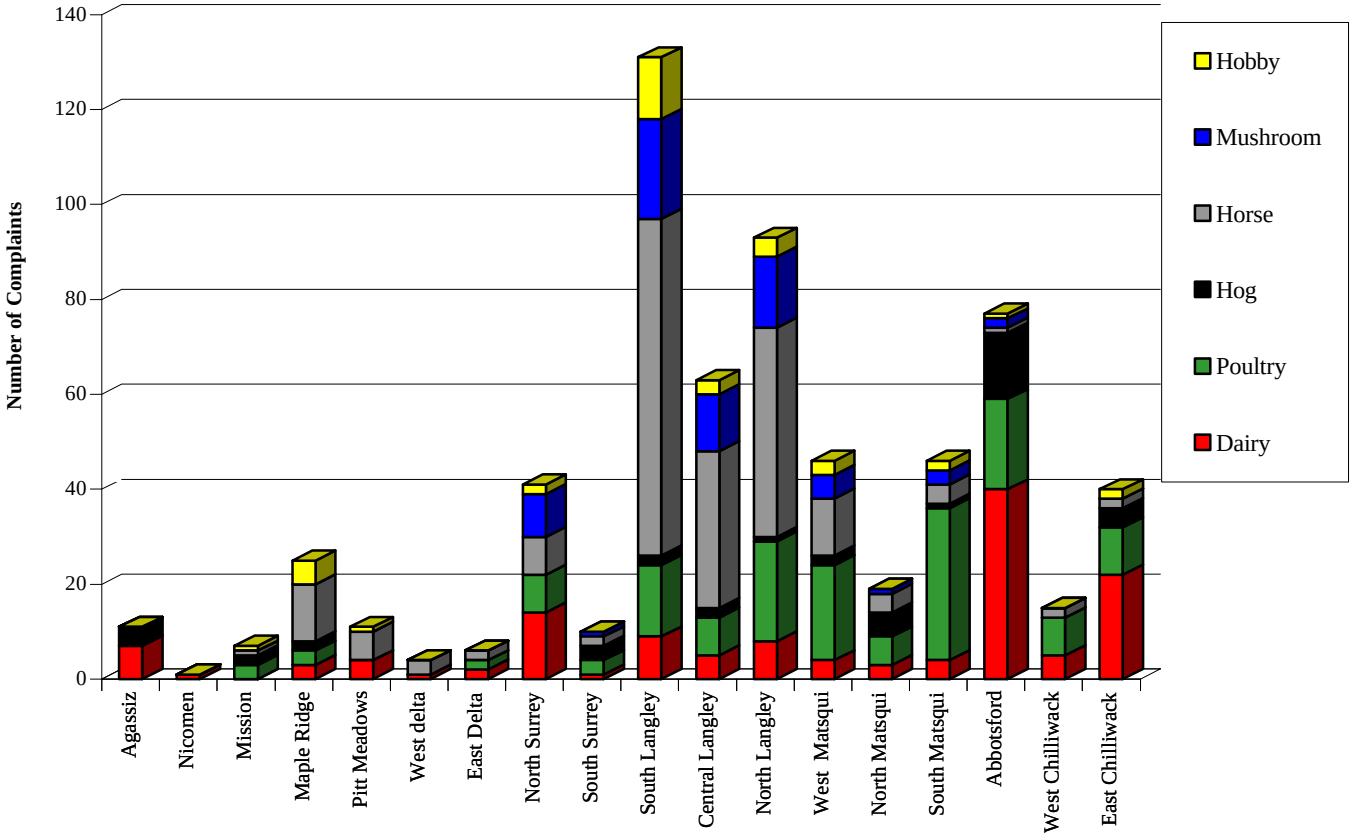


Figure 11 : Agricultural Complaint Breakdown for Lower Fraser Valley by Fiscal Year

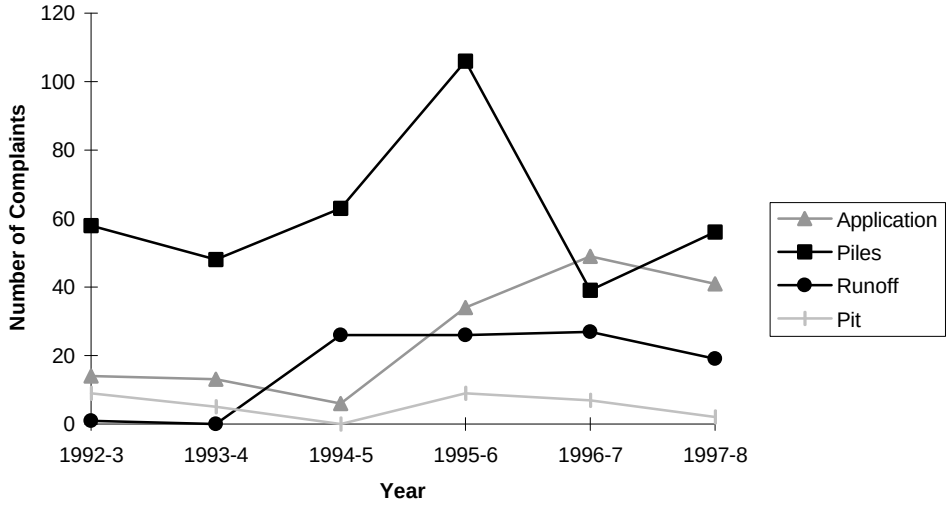
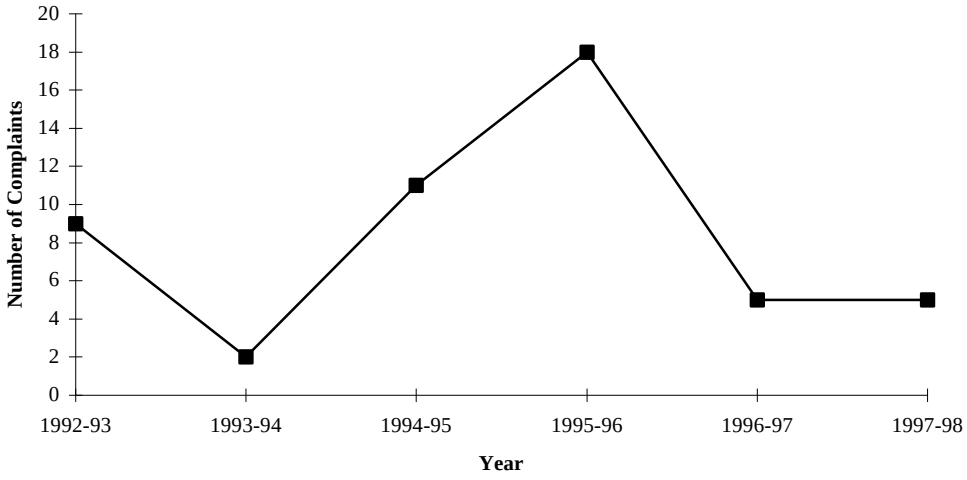


Figure 12 : South Matsqui - Abbotsford Aquifer Manure Pile Complaints by Fiscal Year



4.2.1.1 Storage Complaints

Approximately 33% of the agricultural waste management complaints have been in response to the improper storage of solid agricultural waste. The Code states that for areas receiving a total average precipitation of greater than 600 mm (24 in.) during the months of October to April inclusive, field stored solid agricultural wastes, except vegetation waste, must be covered from October 1 to April 1 inclusive to prevent the escape of agricultural waste that causes pollution. The number of complaints in 1996/97 was notably lower than the two previous years (33% compared to 1994/95 and 45% compared to 1995/96) (Figure 11). However, with the level of annual variability shown it isn't possible to determine if this is definitely an improvement reflecting some progress on this issue. Progress in this area can be seen in the South Matsqui zone in recent years with the number of complaints for uncovered manure piles being reduced by 72% since 1995 (Figure 12). This may partially be attributed to the fact that in the fall of 1995, MELP increased monitoring of the regulation by flying over the Abbotsford aquifer and recording any field stored manure that was not covered. This action received wide coverage by the local newspapers and commodity newsletters.

4.2.1.2 Application Complaints

Files related to the application of manure to land have increased (Figure 11). The apparent increase in the number of complaints related to manure application may be a response to the increased awareness surrounding this issue (see Section 4.2). Common practice was to empty manure storage facilities on bare soil in the fall, principally on land recently harvested of corn, in order to maximize winter storage. For operations with limited storage capacity, it becomes necessary to apply manure during the winter. In the winter the plant's nutrient requirements are limited, soils are frequently water saturated and the risk of runoff causing pollution is at its greatest. Research has shown that that most of the nitrogen applied in the fall on bare ground (harvested corn) was lost over winter so that there was little apparent value for the subsequent crop. Manure spread in the fall (mid-September, mid-October) on perennial forage grass species or fall-planted cover crops benefited subsequent spring harvests (Bittman, 1997). The development of forage grass production guidelines for coastal areas is currently in progress (S. Bittman, personal communication, Agriculture Agri-Food Canada).

The Code states that manure may only be used as a fertilizer or soil conditioner. However, in many instances, manure appears to be treated as a waste which needs to be disposed of, rather than as a valuable resource managed for crop production. In the ongoing process of implementing the Code and developing and responding to new information, it was necessary to describe the boundaries of acceptable risk to protect the environment. Manure Management Guidelines were developed to help the agricultural community and government agencies in the Lower Fraser Valley identify activities which, under certain conditions, had a high risk of being out of compliance with the Code (Appendix 1). The Guideline outlined the risks of spreading manure during various times of the year on: established grassland; cover crops and fall seeded grassland; berry crops; and bare land.

There is considerable yearly variation in rainfall in the LFV. The emphasis on manure management needs to consider ensuring adequate storage and nutrient management planning, rather than "fine tuning" disposal opportunities around an unpredictable variable such as rainfall. The cumulative rainfall in the fall (e.g. October and November) varied considerably and ranged between 195mm in 1993 to 618mm in 1995 (Figure 13). As well, the rainfall patterns vary greatly. There were extended periods of low rainfall such as in 1993, but more often, the pattern is frequent heavier rainfall events between short periods (1 to 3 days) of low or no rainfall (Figure 14).

4.3 Measuring Progress

Application of the Code to meet a high standard of waste management should be an effective tool in remediating conditions that are impacting upon surface water and/or groundwater quality. When conducting onsite inspections in response to a complaint, MELP are required to determine the severity of the problem and make appropriate recommendations to bring the producer into compliance with the Code. In some areas, due to large imbalances in the amount of nutrients generated in an area (e.g. South Matsqui Zone - Abbotsford aquifer), the intent of the Code can only be met by removing manure to other areas in the LFV or elsewhere.

The preferred approach is to provide producers with education and information with respect to the environmental impacts caused by poor agricultural waste management practices. With this approach there has been some real progress made towards achieving environmental sustainability. However, in some cases the softer approach is not always effective and stronger enforcement action has been taken. For those producers who persisted in farming in ways that did not meet the Agricultural Waste Control Regulation, a Pollution Prevention Order or Abatement Order process was initiated (see Figure 9). In some situations tickets or a summons to appear in court under the Waste Management Act were issued.

4.3.1 Offences

Since the "Code" came into effect in April, 1992 eighty-four (84) Orders have been issued within the 20 zones, of which, sixty-seven (67) have been complied with to date. Four offenders have been charged and three offenders have been ticketed under the Waste Management Act. The Conservation Officer Service has served 11 warning-letters stating that the recipient is in violation of the Waste Management Act.

The introduction of Pollution Prevention Orders in 1995 helped considerably with implementation of the Code. It allows the Regional Waste Manager to issue an Order against an offender where an activity or operation is being performed in a manner that may cause pollution. If the Order is not complied with, the offender may be charged for violation of the Order and without having to prove pollution. To date, four charges for non-compliance with an order have been laid - three of which have resulted in a summons to appear in court and one $500 ticket being issued.

Figure 13 : Cumulative Rainfall for October and November- Abbotsford

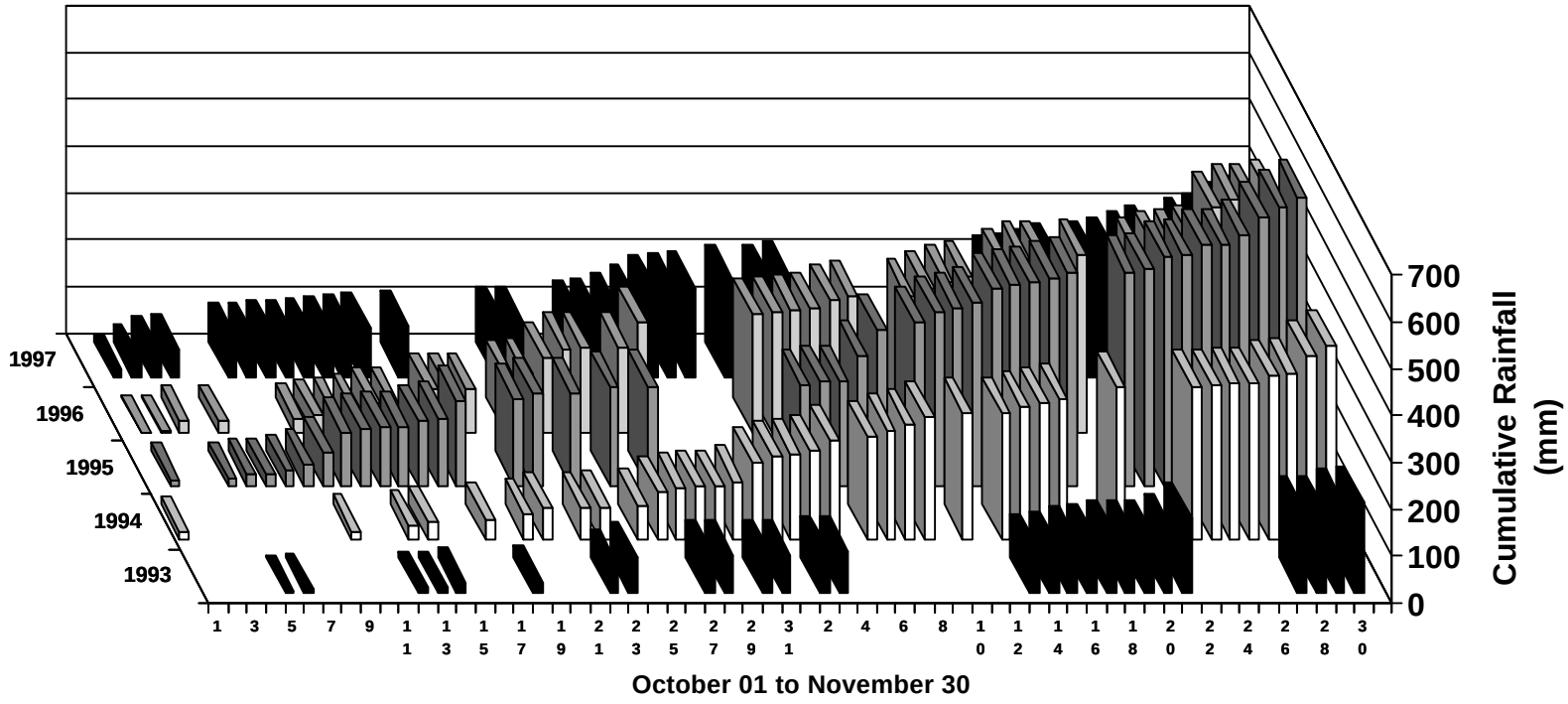
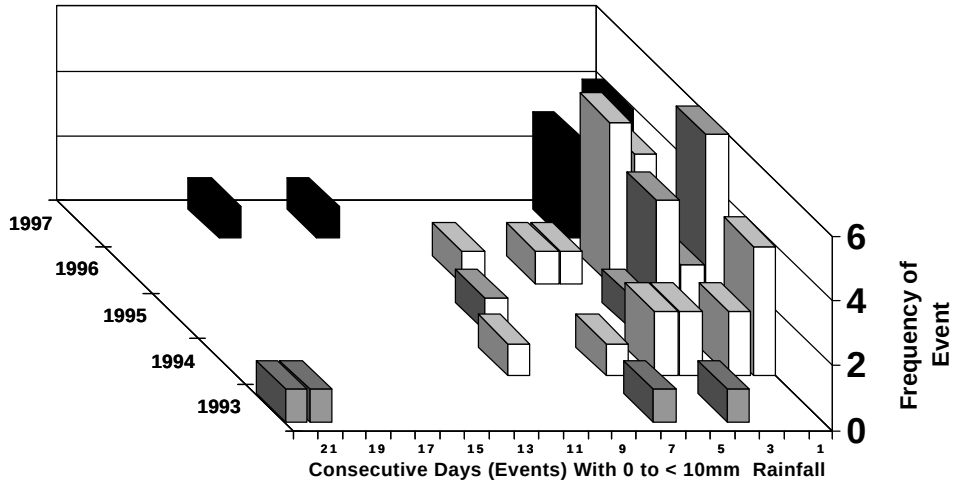


Figure 14 : Abbotsford Fall Rainfall Distribution
- October 1 to November 30 Period



Of the eighty-four Pollution Prevention Orders or Abatement Orders issued to date, four have been appealed. At the time this report was being prepared, the two most recent appeals, involving the application of dairy manure to a harvested corn field in winter, had not been heard. The other two orders which were appealed concerned: (1) pollution of a drinking water well as a result of a discharge originating from the deposition of turkey manure on the property of the appellant and (2) excess application of dairy manure to a harvested corn field with runoff entering the Fraser River. Both appeals were granted by the Appeal Board in favour of the appellant.

Charges laid under the WMA related to agriculture vary from the introduction of a business waste to the environment, introducing a waste in such a manner as to cause pollution, failing to report a spill, failing to develop a Best Agricultural Waste Management Plan (BAWMP) to failing to comply with an Order. Fines in three cases have ranged between $1,500 and $2,500 on each count. Two cases are still in progress and one is pending charges. In a recent judgement, in favour of the defendant, the court identified that Section 12 of the Code did not explicitly state that agricultural waste must be applied to the land only as a fertilizer or soil conditioner consistent with good farming practices (Official Transcript, 1998). This judgement highlights the need to address this limitation in order to better protect the environment.

4.3.2 Complaint Resolution

Over the past few years there has been a definite improvement in waste management practices on many farms, in some cases at great expense to the producer (Plates 7 & 8). Of the 958 complaints responded to by MELP, 817 have been resolved satisfactorily. However, there are still a number of producers continuing to apply manure on bare corn land in the fall, spreading manure throughout the winter high rainfall period, often on bare ground, and discharging milk house wastes to the nearest ditch. Producers who have spent the money and time to do things right may be discouraged with seeing other operators not making changes and continuing on as usual.

In some cases it is important to take the time to fully understand the environmental problem and develop appropriate contingencies and plans to deal with it. Some producers initially responded to MELP by readily agreeing to comply with the Code, but follow-up inspections showed that often changes were not made and only, when there was no other alternative other than a Pollution Abatement/Prevention Order. It may be that these producers do not understand the link between poorly managed agricultural waste practices and being good environmental stewards to protect their community water resources. If this is the case, necessary steps must be taken by MELP and MAFF to ensure that these individuals become adequately informed in order to understand the seriousness of the impacts they are creating on the environment.

The majority of producers should be aware by now of the potential environmental impacts associated with agricultural waste management, as well as the requirements set out in the Code, and they have taken positive steps to protect the environment. Strengthening

Plate 7: Building Under Construction to Store Poultry Manure Previously Left Exposed to the Elements.

Plate 8: Enclosed Hog Manure Composting Facility for Waste Produced by Hogs on Litter.

legislative requirements in order to protect the environment is an evolving process and part of MELP's mandate. Hutton, 1987, expessed concerns regarding agricultural waste management. One of Hutton's conclusions was that by exempting farms from waste management permits, it relinquishes a great deal of control over a large potential source of pollution. Hutton recommended that the policy of exempting farms from Waste Management Permits be reviewed.

4.4. AEPC Complaint Process

When the BCFA formed the AEPC, it was intended that agricultural complaints be addressed using a peer advisor process. Given the opportunity to interact one-on-one and being provided with environmental and technical information, individual farmers were expected to voluntarily adopt corrective measures. This was expected to reduce the need for regulatory agency involvement. The main premise of the peer group process was that they would be well equipped to advise fellow producers on alternate, more acceptable and practical methods that could be utilized.

Due to a number of factors this process has not been fully implemented and in as timely a manner as originally envisioned. A shortage of peer advisors, varying degrees of commodity group support, and insufficient environmental training appear to be the most obvious obstacles. As much of the earlier training was production orientated, the peer advisor(s) may not have been adequately informed on environmental issues and unable to relay that aspect to the producer. In some cases an environmental problem may not have been passed on to MELP for action, resulting in future and/or continuing environmental impacts. As peer advisors are volunteers, potential time conflicts between addressing a registered complaint and running their own farms can occur. In many cases follow-up inspections by peer advisors were not conducted. Consequently, agricultural waste management concerns may have remain unresolved and/or left unreported. While BCFA had been working on setting up a province wide computer complaint tracking system, it wasn't compatible with the Regional Office system and hasn't been effectively demonstrated.

At the time this report was being prepared, MAFF provided a one day training program for peer advisors which addressed many of these problem areas. Department of Fisheries and Oceans and MELP were invited to participate in the training program. Producer attendance was quite low for the dairy and poultry commodities (three and four advisors, respectively) with no representation from the hog industry. On the first day the Horticultural Coalition were represented by eleven advisors. Before MELP can forward complaints to peer advisors, some assurance that they can be handled in a satisfactory and timely manner is required. This would be enhanced if the peer advisory service tracking system could be demonstrated to be a useful tool, providing timely status reports. It is important that peer advisors be familiar with the relevant commodity Environmental Guidelines and willingly support the Manure Management Guidelines for the Lower Fraser Valley. To date, the hog producers have not sanctioned their Environmental Guidelines. However, the association has taken positive steps towards resolving their waste

management problems and have been working with MAFF and MELP to develop a transition plan which, when implemented, should bring the majority of hog producers into compliance with the Code.

One obstacle which, even after five years, seems to prevent the system from working satisfactorily is the misunderstandings and confusion by producers over the roles of MELP and the peer advisory service. At the time this report was being prepared a Memorandum of Understanding (MoU) was being negotiated between the Agriculture Protection Advisory Service, the Horticultural Coalition and the Cattlemen's Association which would address many of the concerns identified above and allow for a better working relationship between the stakeholders involved.

4.5 Awareness and Education

To ensure that a high standard of waste management is maintained, MELP has continued to use the Code as an essential tool in rectifying conditions that are impacting upon surface water and/or groundwater quality. In that process, education is an important element.

4.5.1 Short Courses

The approach taken by MELP in addressing agricultural issues in the Lower Fraser Valley has by necessity has been largely reactive rather than proactive due to limited resources. Moving from a largely reactive position to a proactive one and increasing interaction between the producers and the Regional Office is necessary, over the long-term, in order to promote stewardship and pollution prevention. For the past five years the Regional Office has had some proactive involvement by participating in Short Courses sponsored by the Horse, Dairy and Horticulture Industries. Information displays (Plate 9) and a farm model identifying some 21 pollution sources (Plates 10, 11and 12) are used to increase awareness.

4.5.2 Municipal - Informal Referral Process

As a result of a meeting with the Township of Langley's Planning Department in June 1994, it was agreed that prior to their issuing a building permit for a farm operation, the applicant would be referred to MELP for their input. Through this informal process it was felt that information could be provided to the proponent with respect to proper waste management practices. The procedure involved the provision of information packages and in some cases onsite visits. A similar process, but on a smaller scale (intensive farm operations only), has been developed with both the City of Abbotsford and City of Surrey Planning Departments. This process has proven to be useful but has been limited by available resources.

Plate 9: Information Display with Farm Model Demonstrating a Number of Farm Practice Problems

Plate 10: Livestock Access to Watercourse is a Riparian and Water Quality Issue

Plate 11 (above): Limited Vegetated Riparian Buffer Zone Increases Risk of Contaminated Runoff Entering Watercourse

Plate 12 (right): Eutrophication of Surface Waters due to Nutrient-Rich Runoff from Agricultural Areas

4.6 Water Quality Trends

The experience with the USEPA Rural Clean Water Program (EPA, 1993) and Section 319 National Monitoring Program (EPA, 1995) to assess the effectiveness of watershed technologies (e.g. best management practices) designed to control non-point source pollution, even in ideal situations, showed that frequently a 6- to 10-year evaluation period was required. Paired watershed studies are viewed as a more efficient and successful means to demonstrate improvements in water quality due to the implementation of Best Management Practices (BMP's). This requires the adoption of BMPs in one watershed while the other continues to use potentially "polluting" practices.

The monitoring which was being conducted in the Matsqui Slough watershed and some adjoining streams (see Section 3.2.4) is a mixture of a traditional upstream/downstream and single downstream approach. The implementation of the Code was not imposed on the agricultural industry per se but has been an evolving process and had been largely unmonitored. As such, improvements in water quality cannot be expected to be demonstrated quickly, if at all in many areas. Measuring improvements is even more complicated in watersheds such as Matsqui Slough which are hydrologically complex (i.e. a mixture of upland forest and urban catchments, lowland intensive and diverse farming activities and flood control gates regulated principally on Fraser River flow conditions). Nevertheless, monitoring provides a record of current conditions and provides a benchmark from which to measure improvements or even worse, that conditions are deteriorating.

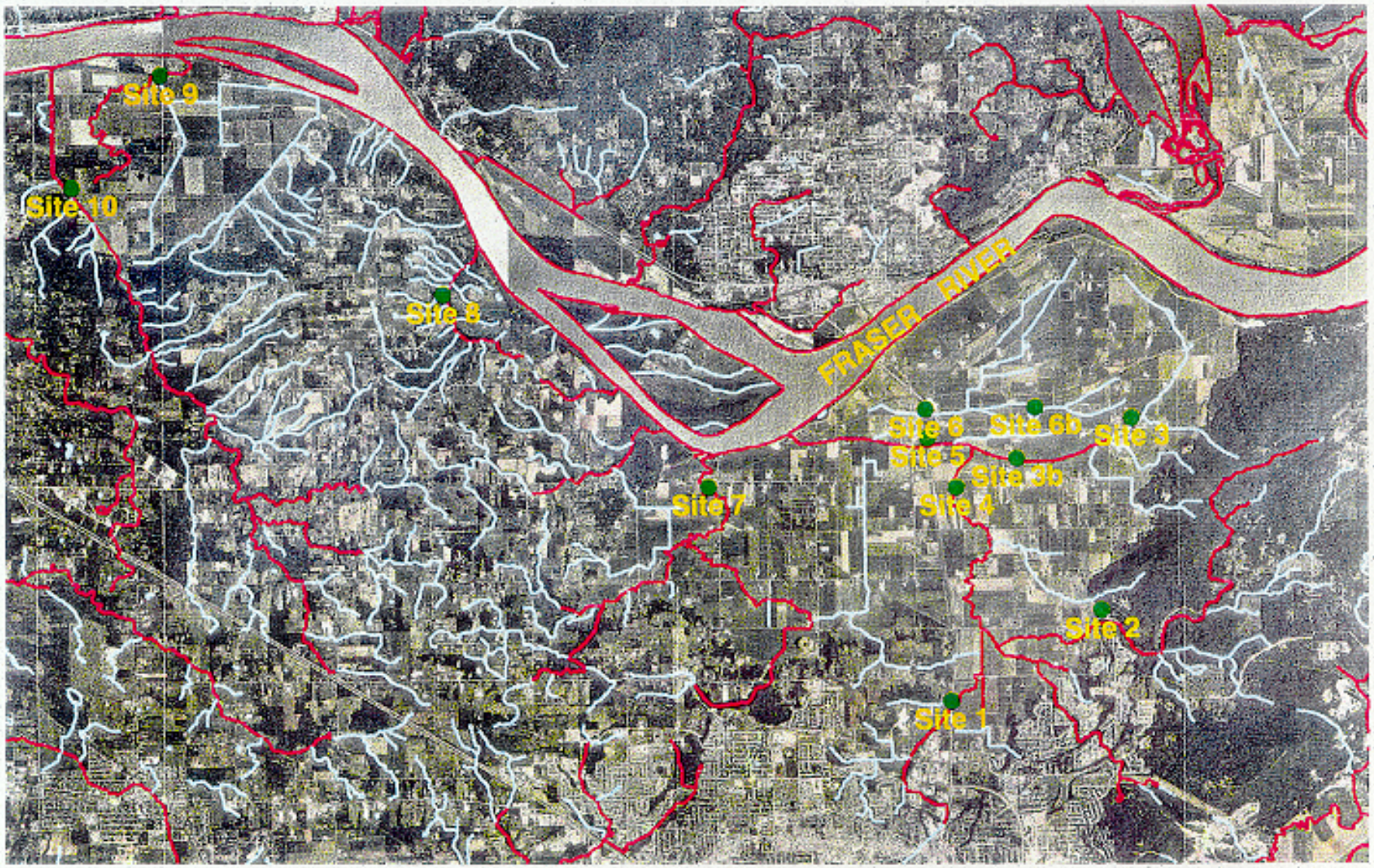
4.6.1 Nitrate

Nitrate could serve as a possible indicator of changes in nutrient management in some areas of the Fraser Valley. Some observations can be made with respect to stream nitrate levels. There appeared to be a close relationship between rainfall intensity (three day cumulative total of sample day and preceding two days) and surface water nitrate levels earlier in the rainfall season. This is demonstrated for Site 4 (see Figure 15 for site locations), the downstream agricultural area site, in 1994 (Figure 16a) and in 1995 (Figure 16b). Sites 1 and Site 2 are the upstream control locations. The downstream increase in nitrate is not surprising as nitrate is highly mobile and is flushed from the soil profile quickly. Later in the rainy season, in both years, stream nitrate levels do not appear to show as close a relationship with rainfall. This is an important relationship to establish for future comparisons. Brisbin, 1995 reported that the North Matsqui zone (which Matsqui Slough drains) had a large farm nitrogen balance of 152 kg N/ha over what crops required. This same relationship is evident in other streams (Figure 17). Site 7 had even higher nitrate levels than Site 4 and the former drains part of the West Matsqui zone which had an even greater large farm nitrogen balance of 302 kg N/ha.

4.6.2 Dissolved Oxygen

Dissolved oxygen saturation levels in the fall are clearly lower in the downstream areas of Clayburn Creek (Sites 4 and 5) compared to the upstream Site (Site 2) (Figure 18a and 18b). Site 1 which is also an upstream control site and drains an urban catchment also has reduced oxygen levels. The monitoring to date has identified reduced oxygen levels in a number of intensively cultivated flow-regulated agricultural lowland streams. However, the monitoring has not adequately demonstrated the full extent (spatially and temporally) of the situation which would be important from a fisheries perspective.

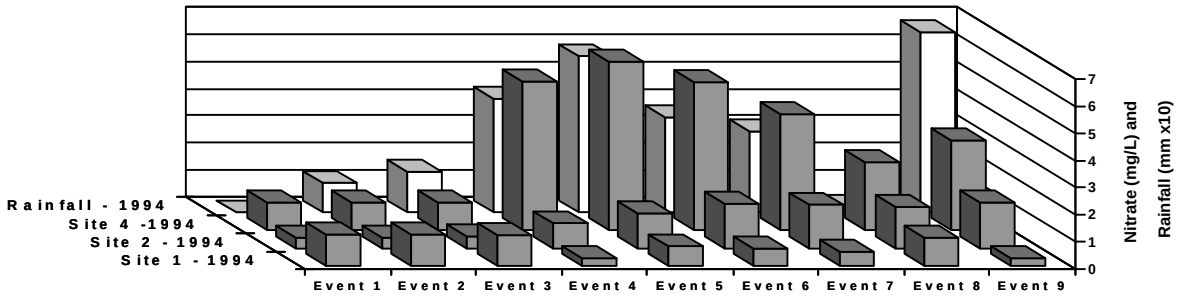
Figure 15 : Matsqui Slough and Adjacent Stream Water Quality Monitoring Sites



Source: J. Nener, DFO

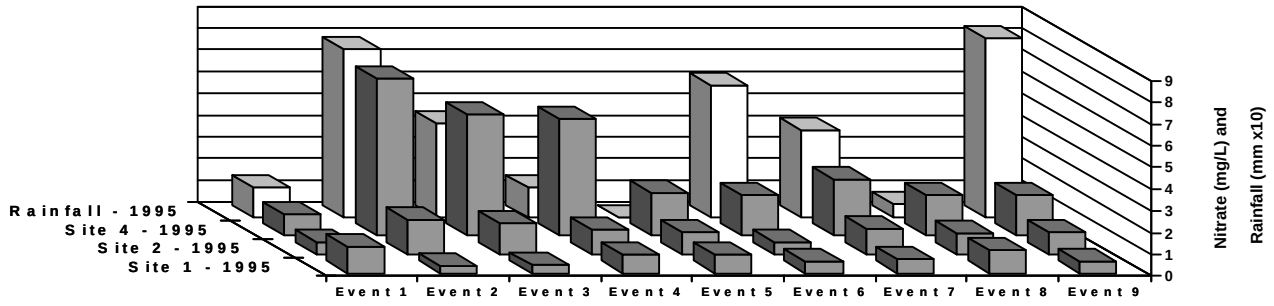
Known Fish Presence Unknown Fish Presence

Figure 16(a) : Relationship Between Rainfall and Stream Nitrate Levels
in Matsqui Slough - 1994



Oct 6 Oct 13 Oct 19 Oct 27 Nov 2 Nov 8 Nov 16 Nov 24 Nov 30

Figure 16(b) : Relationship Between Rainfall and Stream Nitrate Levels
in Matsqui Slough - 1995



Oct 4 Oct 12 Oct 18 Oct 26 Oct 31 Nov 7 Nov 16 Nov 22 Nov 30

Figure 17: Relationship Between Rainfall and Stream Nitrate Levels

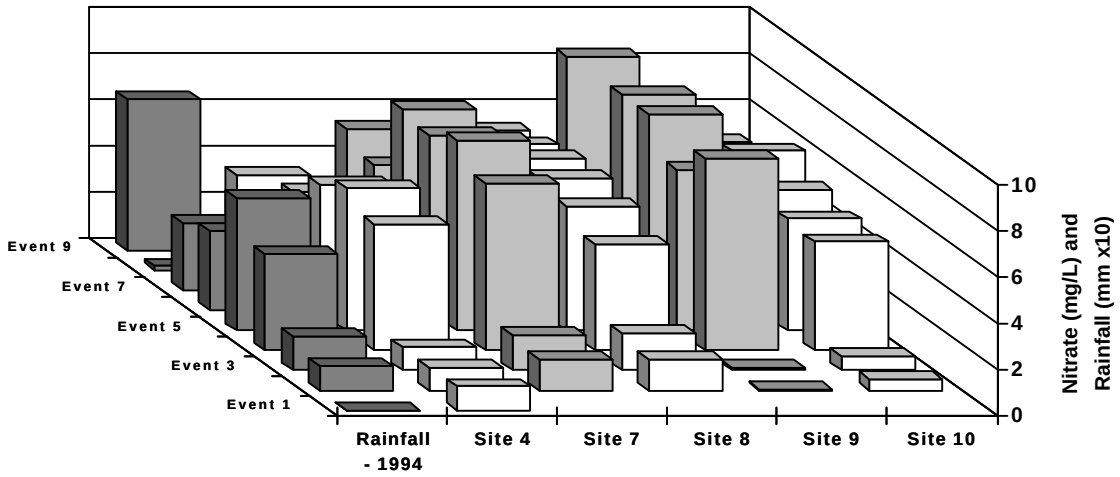


Figure 18(a) : Annual Variation in Median Oxygen Saturation Levels
in North and West Matsqui Zone Streams

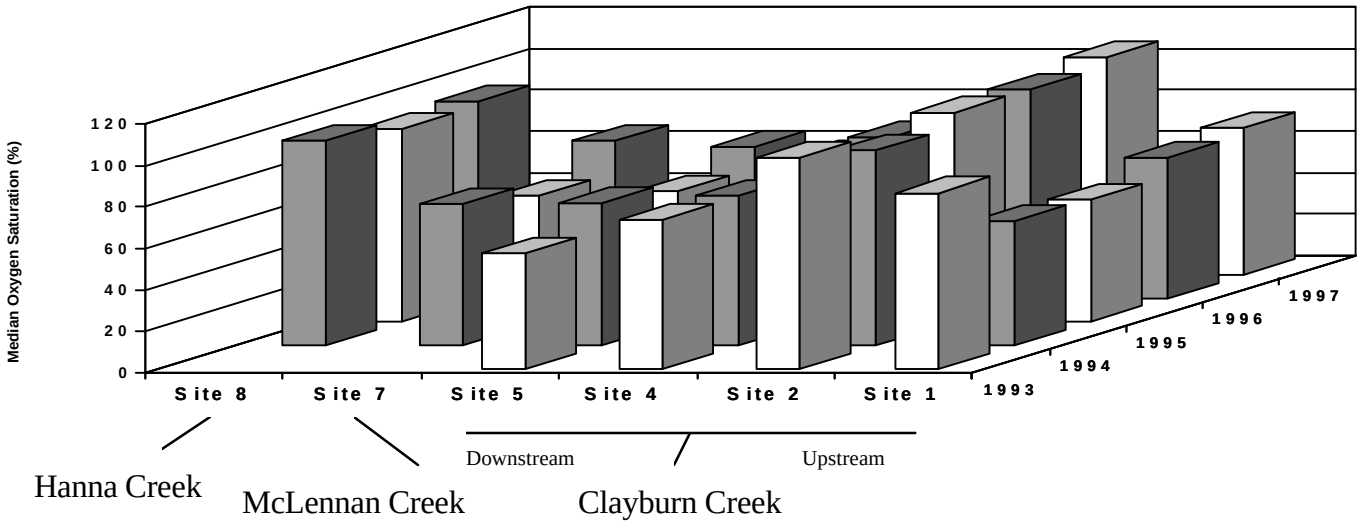
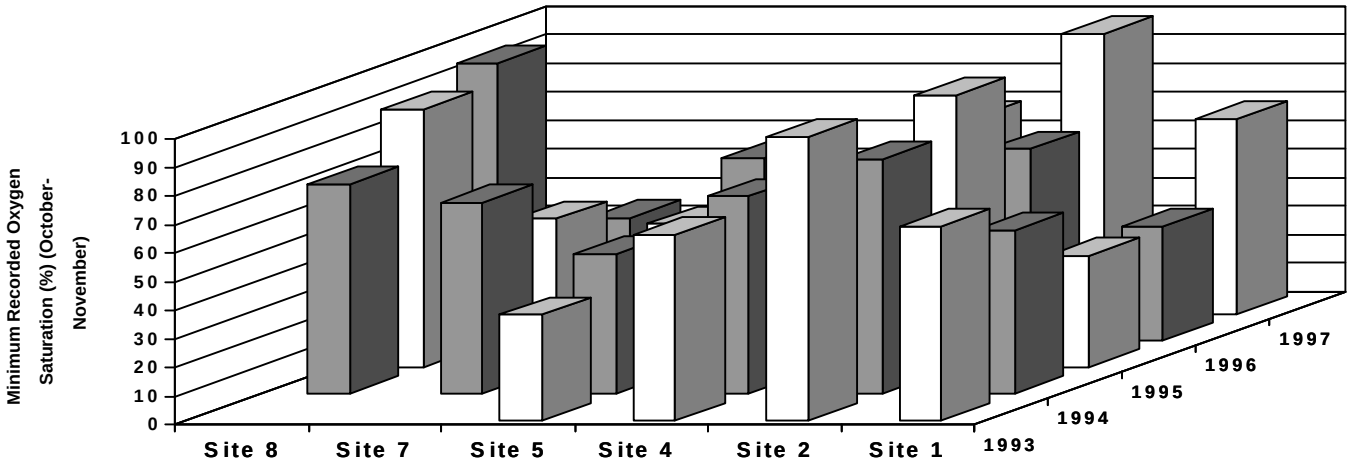


Figure 18(b) : Annual Variation in Minimum Oxygen Saturation Levels
in North and West Matsqui Zone Streams



5.0 CONCLUSIONS

- The magnitude of the agricultural waste complaints received by MELP in the Lower Fraser Valley (~180 per year) combined with the experience gained over the last three years, indicated that all complaints could not be efficiently addressed at current resource levels.

- The self-monitoring peer advisor approach, which was intended to assist producers with environmental problems and to keep the industry out of the waste management permit system, has evolved slowly and as a consequence, hasn't proven to be that effective. Some producers still have the attitude that the Code doesn't apply to them until they are confronted with a problem.

- The peer advisory service complaint handling process has not yet developed to a stage where complaints are being investigated and rectified in a timely fashion and MELP is not being updated on the outcome of complaint investigations. A shortage of trained peer advisors, variable commodity participation, insufficient environmental awareness and training of peer advisors are obvious obstacles to the success of the advisory service. Current efforts to develop better defined roles and responsibilities between MAFF, MELP and APAS, BCHC and BCCA could help this process move towards the model originally envisioned.

- Experience has revealed that the reasons for non-compliance with the Code vary, ranging from an honest lack of knowledge to one of complete indifference. Several larger-scale producers aware of the Code and its requirements still contend that it is impractical.

- In the last two years, there appeared to be a reduction in the number of complaints related to manure piles in the Abbotsford aquifer area. This could be a response to MELP's proactive media notification efforts, increased MELP field presence, increased awareness through peer advisory service programs or a combination of these and other factors.

- There appeared to be an increasing trend with respect to the number of complaints related to waste application. This could be a response to increased awareness (public/producer) and recent multi-agency efforts to address late-fall and winter manure applications and the development of Manure Management Guidelines for the Lower Fraser Valley.

- There is still a need for more producers to recognize the link between exercising environmental stewardship action to preserve the water resources of the Lower Fraser Valley and the poor waste management practices evident on some farms.

- The severity of potential environmental impacts caused from a lack of tracking agricultural development may be best exemplified by the Abbotsford aquifer situation.

A formal process for tracking farm expansion and use of the ALR land base for agricultural waste management is needed.

- Strengthening the AWMR so that specific practices outlined in the Code constitute a violation, without having to prove pollution, would strengthen MELP's ability to deal with problems. More specifically, the need to clearly define that agricultural wastes must be applied consistent with good farming practices, is required

- The free Best Agricultural Waste Management Plan service provided by MAFF was discontinued in 1993. Producers appeared reluctant to voluntarily have BAWMPs developed due to the added cost and this often prolonged environmental problems.

- Water quality studies on a limited number of sites have been conducted to establish benchmark water quality conditions in a number of streams. Nitrate appeared be a good water quality indicator that would repond to management measures related to changes in farm nutrient management practices Dissolved oxygen levels in a number of lowland, flow regulated streams are low and at levels that could affect fish. A more detailed temporal and spatial analysis of dissolved oxygen levels is required. It is too early to expect that water quality conditions may have improved considering the extented and implementation of the "Code" and experience gained in the USA.

- Attention needs to be focused on ensuring the proper installation of earthen lagoons in areas with inappropriate soil structure.

- A review of the Pollution Abatement Order and Pollution Prevention Order appeal process and hearing decisions is required. Agricultural waste issues need to be afforded the importance given other waste problems such as industrial and special wastes.

- With the implementation of the Canada-BC Green Plan for Agriculture and FRAP, communication and interaction between the various agencies, both federally and provincially, throughout the Valley has increased. However, there are still some communication and jurisdictional issues that need to be addressed.

6.0 RECOMMENDATIONS

- MELP should develop a more proactive role in agriculture. The resourcing needed to ensure delivery of the AWMR and Code should be reviewed on a regular basis.

- More committment from the agriculture community to increase environmental education and awarenesswould enable peer advisors to increase their knowledge of the potential severity of agricultural impacts and to deal with them more effectively.

- The burden of proof should lie with the agricultural industry in the LFV to demonstrate

that they are environmentally sustainable, this information should be provided on a regular basis - through on farm practice surveys. The Abbotsford aquifer exemplifies a situation where tracking land use practices and changes in the industry might have lead to an earlier realization of an impending problem.

- To provide some confidence that complaints will be handled in an environmentally responsible and timely manner, all peer advisors need to complete the training session offered by MAFF and which should be expanded to include a practical field training component.

- The Peer Advisory Service should encourage all commodity members to operate in compliance with the Code and to use conservation and stewardship practices that protect the environment. A peer advisory tracking system needs to be effectively implemented so that the complaint resolution process can be demonstrated to be working.

- Joint training inspections involving MELP, MAFF and peer advisors in the LFV should be conducted once a year. This could become an element of MAFF's peer advisor training program.

- The Code should be reviewed and strengthened in the context of addressing the need to prove pollution to demonstrate non-compliance and to determine what constitutes good farming practices from an environmental protection perspective.

- The point at which a farm needs to be permitted is an area that should be addressed. There are still no farms under the WMA permitting system although compliance with the intent of the Code, in terms of adequate storage and applying agricultural waste only as a fertilizer or soil conditioner is questionable.

- If the present system cannot successfully manage agricultural wastes, other options require consideration. One option may be requiring all producers to apply for a permit exemption. The application would include the submission of inventory information which would be used to which farms would require a Nutrient Management Plans before receiving a permit exemption. New farming enterprises or expansions would be required to submit a waste management plan to MELP. Resources to manage this process would be required.

- BCFA, MAFF, and MELP need to share information with respect to those producers who are in non-compliance and may be causing pollution to the environment. The Code has been in effect for five years and increased effort to demonstrate that the AWMR is working is required.

- A one-window system should be assessed, whereby all agricultural waste management problems are directed to one agency initially for tracking. All agricultural complaints

received by MELP and MAFF, federal and local government, and the peer advisory services would be logged onto one central database. As the Agricultural Waste Control Regulation is provincial legislation, MELP should be the agency to act as this window.

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Appendix 1

Manure Management Guidelines for the Lower Fraser Valley

MANURE MANAGEMENT GUIDELINES

For the Lower Fraser Valley

BC Environment will continue to ensure compliance with the Agricultural Waste Regulation to protect the environment. The following guidelines were prepared in consultation with the Ministry of Agriculture, Fisheries & Foods (MAFF), the Agricultural Environmental Protection Council (AEPC), various commodity groups and Producer Conservation Groups. The federal Department of Fisheries and Oceans (DFO) and Environment Canada were also part of the consultation process.

These guidelines are intended to help producers identify activities which, under certain conditions, have a high risk of being out of compliance with the Code of Agricultural Practice for Waste Management (the Code).

Goal: Compliance with the Code.

Issue: An excess of nutrients and other contaminants entering surface and groundwater in the Lower Fraser Valley have resulted in reduced water quality. During high risk periods, runoff from manured fields and uncovered manure piles has been a significant source of excess nutrients and other contaminants in surface and ground water.

Producer Responsibility: Under the Code, manure must be applied to land only as a fertilizer or soil conditioner. Because most manures have a high nutrient content they should be managed primarily as a fertilizer and secondarily as a soil conditioner.

Note: Manure should be applied at the same times of year as inorganic (chemical) fertilizer would normally be applied.

Runoff must not be allowed to pollute watercourses (ditches, streams, etc.) or groundwater supplies.

Producer Benefit: Manure is an important resource and an integral component in a wide variety of sustainable agricultural systems. When applied at appropriate agronomic rates during the growing season, manure can be a valuable source of plant nutrients and organic matter.

MANAGING RISKS

Spreading manure during **any high rainfall period** is not recommended because of the potential of causing pollution. During these periods:

- the risk of contaminated runoff entering into watercourses is high, and
- the risk of groundwater contamination due to leaching is high.

In order to meet the Code it is recommended that manure not be applied:

- on land where runoff is likely to occur;
- on snow or frozen ground; or
- at rates which exceed the amount required for crop growth.

High Rainfall/High Risk Periods:
November, December and January

Moderate Rainfall/Moderate Risk Periods:
September, October
and February, March.

The next 5 items discuss the risks of: spreading manure on established grassland, cover crops and fall seeded grassland, berry crops, and bare land; and uncovered manure piles.

1. Spreading Manure on Established Grassland

A grass relay cropped with corn is considered to be the same as grassland providing it is well established. Grasslands planted after September 1st should be treated the same as a cover crop (see Item 2 below).

To reduce the risk of contaminated runoff or leaching of nutrients to groundwater during the moderate and high risk periods it is recommended that:

- manure not be spread during November, December, and January (periods of high risk);
- not more than approximately 1/4 of the annual nutrient requirements be spread during September and October (periods of moderate risk);
- not more than approximately 1/3 of the annual nutrient requirements be spread during February and March (periods of moderate risk); or
- not be spread closer than 10 metres (30 ft.) from ditches and streams (periods of high to moderate risk - September to March).

2. Spreading Manure on Cover Crops and Fall Seeded Grassland

A cover crop, planted in the spring or summer or grassland planted before September 1st and actively growing in the fall, has the same environmental concerns and recommendations as grassland (see Item 1 above).

To reduce the risk of contaminating surface or ground water it is recommended that:

- a cover crop or grassland planted in the fall (after the beginning of September) should not receive manure in the fall as there is usually enough nitrogen remaining in the soil to meet cover crop or grassland needs at that time; or
- a cover crop or grassland planted in the fall, for which the need for nitrogen has been confirmed by a soil test, may have some manure applied during September and October; and
- manure be applied after January only if the cover crop or grassland is well established.

3. Spreading Manure on Berry Crops

To reduce the risk of contaminating surface water or groundwater it is recommended that:

- manure not be spread from July to mid-February, inclusive; and
- when preparing a field for planting the following year refer to Item 4, Spreading Manure on Bare Land.

4. Spreading Manure on Bare Land:

Bare land includes lands from which crops have been harvested (corn, vegetables, etc.), poorly established cover crops, or grass which has been killed. For Raspberry crops see Item 3.

From mid-September until the beginning of March is considered a high risk period for spreading manure on bare land. **During this period spreading manure on bare land as a fertilizer can not be justified.**

The month of March is considered a moderate risk period. To reduce the risk of contaminated runoff or leaching of nutrients to groundwater, it is recommended that:

- manure be spread only if the land will soon be planted;
- manure not be spread closer than 10 metres (30 ft.) from ditches and streams; and
- manure not be spread on land if runoff is likely to occur.

5. Uncovered Manure Piles

The Code requires that field stored agricultural waste be securely and completely covered with a waterproof material from October 1st to April 1st, inclusive.

Compliance With the Code

Non-compliance with the Code may result in the following action:

Uncovered Manure Piles:

A Pollution Prevention Order may be served allowing **one week** to comply. Non-compliance may result in a ticket or formal charges under the Waste Management Act.

Manure Application (not used as a fertilizer or likely to cause pollution):

- efforts will be made to involve peer advisors to resolve the issue as set out in the MoU;
- in some cases MELP staff will respond directly;
- application of manure which causes pollution may result in formal charges under the Waste Management Act; and
- a Pollution Prevention Order may be considered. One of the requirements of the Order may be that a Best Agricultural Waste Management Plan be developed.

If you spread manure during high risk periods there is a good chance that you are not in compliance with the Code. If you are unable to comply with the Code please contact MELP. Staff will try to work with you to develop a solution to the problem as best they can.

Further information

Producers are encouraged to refer to their commodity's "environmental guidelines" prepared by the Ministry of Agriculture, Fisheries and Food in cooperation with their producer associations. The guidelines describe generally acceptable farming practices. However, there may be some portions of the guidelines which do not apply to every farm. In such cases it is the responsibility of the individual producer to consider other management options, as well as these guidelines, to prevent pollution.

Producers may also consider the development of a **Best Agricultural Waste Management Plan/** (BAWMP) **Nutrient Management Plan** (NMP). A BAWMP and a NMP are formal environmental evaluations of a farm by a professional qualified in the field of agricultural environmental assessment. These evaluations will assist the producer in organizing a comprehensive plan that results in the integration of environmentally safe waste and nutrient management practices into overall farm operations. Producers who want a BAWMP and/or NMP prepared for their farm should contact their local MAFF office.

For further information on environmentally sustainable farming, contact:

Ministry of Agriculture, Fisheries & Food
Resource Management Branch:
(1-604)556-3108

Agricultural Protection Advisory Service:
(1-250)592-9353

These guidelines have been prepared by MELP in consultation with MAFF, AEPC & Producer Conservation Groups. For further information on the Code and this guideline please contact:
Bev Locken - (1-604)582-5340