

BC Sustainable Poultry Farming Group,
Abbotsford, B.C.

Groundwater Protection Program

2004/2005 Annual Report

June 2005

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Groundwater Protection Program

2003/04 Annual Report

Acknowledgements

The success of the Groundwater Protection Program can be attributed to the valuable input (financial, professional, or in-kind) from the following persons or organizations:

- Ralph Volkmann, SPFG Chair, BC Turkey Assn.
- Dave Siemens, SPFG V-Chair, FV Egg Prod. Assn.
- Frank Flokstra, BC Chicken Growers' Assn.
- Calvin Breukelman, BC Broiler Hatching Egg Prod. Assn.
- Paul Janzen, BC Broiler Hatching Egg Prod. Assn.
- Stewart Paulson, BCMAFF Poultry Specialist
- Kevin Chipperfield, SPFG Manager
- BC Chicken Growers' Assn.
- FV Egg Producers' Assn.
- BC Broiler Hatching Egg Producers' Assn.
- BC Turkey Assn.
- Agriculture Environment Partnership Initiative
- BC Ministry of Agriculture, Fisheries, and Food
- Agriculture and Agri-Food Canada

1.0 Introduction

The Groundwater Protection Program (GPP) was initiated in the fall of 1995 as a project of the BC Sustainable Poultry Farming Group. The GPP began with the construction of an on-farm conveyor system, built to reduce the high costs associated with transporting manure long distances. A total complement of four conveyors now exists to match the needs of the program.

Manure shipments to distant markets have increased and decreased from one year to the next. (see Table 1). However, there has been an overall average increase in manure shipments to distant markets since program inception in 1995/96. In 2004/05, the Avian Influenza outbreak reduced significantly the volume of manure hauled between April and June 2004. While this resulted in a loss to the amount hauled, it also affected markets such that more manure was marketed to the mushroom compost industry, less to distant markets.

Table 1 Change in Distant Market Manure Shipments from Year 1 (1995/96) to Year 10 (2004/05)

<i>Year of Operation</i>	<i>Shipment Volume</i>	<i>Shipment Period</i>	<i>Increase Over Previous Year</i>
Year 1 (1995/96)	6,200 yd ³	8 months	NA
Year 2 (1996/97)	18,200 yd ³	12 months	+ 96 %*
Year 3 (1997/98)	24,930 yd ³	12 months	+ 37 %
Year 4 (1998/99)	23,675 yd ³	12 months	- 5 %
Year 5 (1999/00)	40,640 yd ³	12 months	+ 72 %
Year 6 (2000/01)	53,240 yd ³	12 months	+ 31 %
Year 7 (2001/02)	40,105 yd ³	12 months	- 25 %
Year 8 (2002/03)	38,760 yd ³	12 months	- 3 %
Year 9 (2003/04)	28,970 yd ³	12 months	- 25 %
Year 10 (2004/05)	24,870 yd ³	12 months	-14 %

* Increase adjusted to reflect the increased Shipment Period from Year 1 to Year 2

2.0 Manure Hauling Activity

During 2004/05, a total of 75 poultry farm hauling events were coordinated (including rentals), with 71 of these events involving shipments of manure to distant or alternate markets (*see Table 2*). This year, manure hauling statistics show an increase in the average amount of manure hauled per event (from about 295 to 390 cubic yards per event). Similar to 2000/01, this increase was affected by an increase in the maximum amount of manure hauled per event (3010 cubic yards this year). The minimum hauling event was 70 cubic yards, similar to other years.

Table 2 – Selected Hauling Event Statistics (cubic yards)

Year	Total # Events Coordinated	# Events to SPFG Markets	Average Volume per Event	Minimum Volume per Event	Maximum Volume per Event
2004/05	75	71	389	70	3010
2003/04	114	104	290	70	700
2002/03	139	129	300	45	1100
2001/02	150	139	297	35	970
2000/01	138	126	365	80	3640

2.1 Manure Handling Connections

Arrangements for manure hauling connections occur in many ways. While the manure is always sourced from individual poultry farms, the method of shipping and the delivery location can vary substantially. Table 3 provides a summary of the marketing arrangements for SPFG coordinated and farmer handled manure hauling events.

Table 3 - Connections for Poultry Manure Shipments for 2004/05 (includes conveyor rentals)

Shipping Arrangements	Distant Markets	Alternate Markets	Local Markets				Total
			LFV	CFV	NFV ¹	UFV ²	
----- Cubic yards -----							
SPFG Coordinated	24,870	-	820	240	1,100	8,105	35,135
Farmer Handled (with conveyor Rental)	0	-	560	1,120	-	-	1,680
Total	24,870	-	1,380	1,360	1,100	8,105	36,815

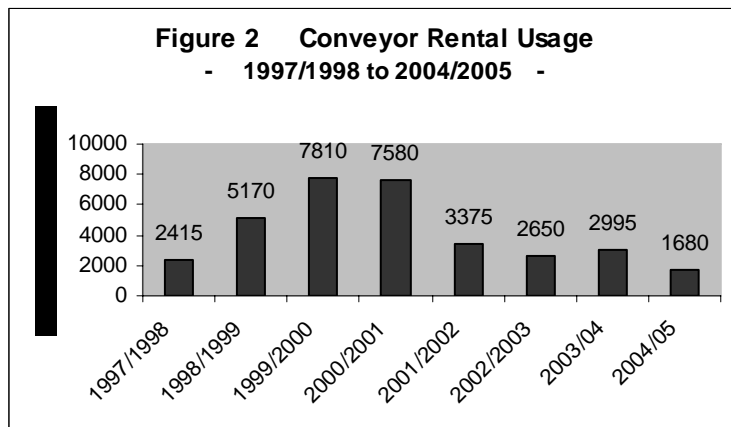
¹ Region north of the Fraser River ² Total includes Chilliwack and Rosedale

From Table 3, a total of 36,815 cubic yards of poultry manure shipments were handled through use of the Groundwater Protection Program. Last year, this total was 33,985 cubic yards.

GPP services include connecting poultry producers with local manure markets, particularly in cases where the manure is too heavy (wet) to transport cost-effectively to distant markets. In many cases, poultry manure was shipped off the Abbotsford Aquifer to the Sumas Prairie or Matsqui Prairie.

2.2 Conveyor Rental Usage

GPP conveyors are available for rent by poultry producers. Poultry producers typically rent a conveyor to ship manure in more cost-effective ways i.e. to a local dairy or crop farm or alternate market. Figure 2 below identifies the usage of GPP conveyors for this purpose. From Figure 2, conveyor rentals peaked in 1999/2000, and have generally declined since then. Conveyors are continuing to increase in importance for manure handling on Fraser Valley poultry farms. SPFG conveyor rental use appears to be decreasing as conveying machinery from other sources is increasingly utilized.



2.3 Sources of Manure Shipped During 2004/2005

As identified in Table 4, most of the poultry farms which ship manure from the Fraser Valley to distant markets are either located directly on the Abbotsford Aquifer (60 %), or nearby within the Central Fraser Valley (28%). Together, both the Central Fraser Valley and Abbotsford Aquifer areas comprise 88 % of shipments to all markets, the largest share since GPP inception.

While the proportion of manure shipped off the Abbotsford Aquifer decreased from 67% (2003/04) to 60% (2004/05), the actual amount shipped directly off the Abbotsford Aquifer stayed about the same. It is likely that the Avian Influenza outbreak acted to reduce shipments off the Abbotsford Aquifer since a significant number of infected farms were located over the Aquifer. Lower Fraser Valley origin shipments were slightly reduced (from 14% to 8%), while Upper Fraser Valley origin shipments remained about the same as last year.

Table 4 Manure Shipments to All Markets from Fraser Valley Areas
- Year 2003/04 compared to 2004/05

Source Area	All Markets	
	- - - Cubic yards - - -	
In Fraser Valley	2004/2005	2003/2004
Abbotsford Aquifer	22,085 (60%)	22,615 (67%)
Central Fraser Valley	10,465 (28%)	4,880 (14%)
Upper Fraser Valley	1,410 (4%)	1870 (5%)
Lower Fraser Valley	2,855 (8%)	4620 (14%)
Total	36,815 (100%)	33,985 (100%)

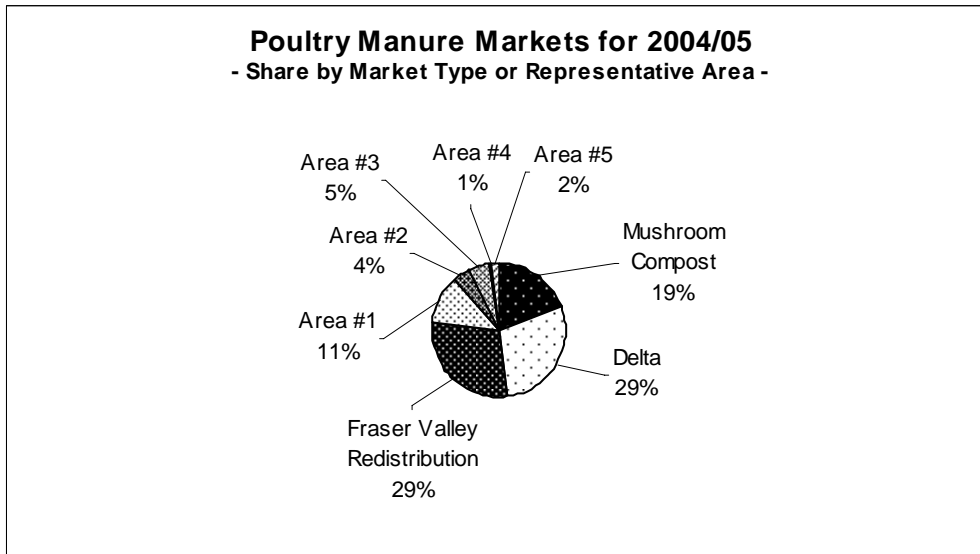
Since shipments originating in the Central Fraser Valley are also considered as reducing the total amount of poultry manure spread on the aquifer area, then one could consider that for 2004/2005, 88 % of shipments to distant markets likely reduced the amount of manure stored and spread on the Abbotsford Aquifer.

2.4 Destination of Manure Shipments

Initially, the challenge was to lead the development of markets to Delta and more recently, Richmond crop producers. GPP peak shipments to Delta occurred in 1999/2000. Since then, shipments decreased. This year, from Figure 2, the largest markets were the Delta/Richmond (29%) and Fraser Valley Redistribution (29%) markets. Percentage of shipments to the BC interior (23% total) and mushroom industry (19%) were slightly lower. The generally larger proportion of shipments marketed to Fraser Valley Redistribution was at least partially related to inclusion of poultry manure by the GVRD and Chilliwack in the yard waste composting

and/or biosolids composting programs, as well as lowered availability in certain areas of the Fraser Valley due to the Avian Influenza outbreak.

Figure 2



Markey Identification Key for Areas #1 - 5:

Area #1
Merritt, Kamloops, Barriere

Area #2
Lillooet, Cache Creek, up to 150 Mile House

Area #3
Princeton, Cawston, OK Falls, Rock Creek, Kelowna

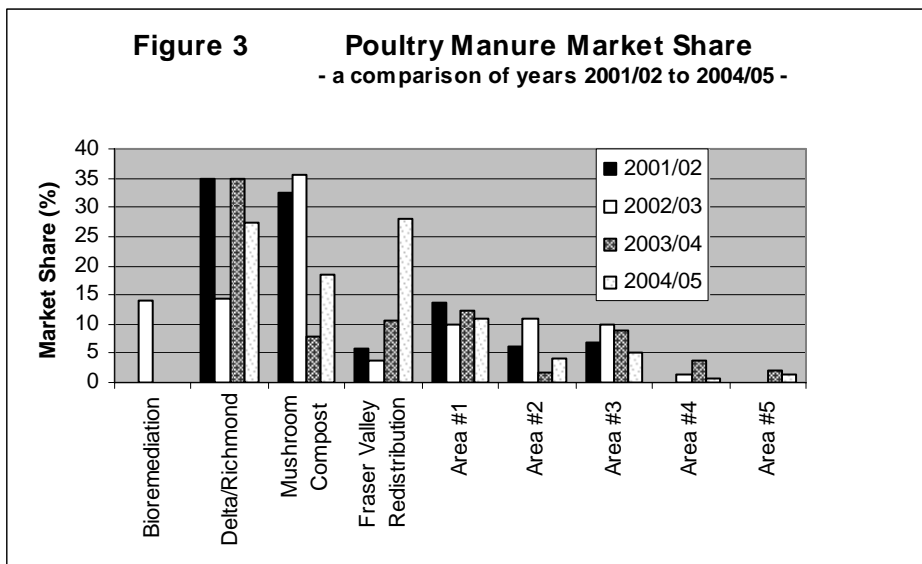
Area #4
Vancouver Island

Area #5
Pemberton, Sechelt

Figure 3 compares manure shipments to various markets over the last four years. This year, Mushroom Compost market share increased from 10% to 29% and Fraser Valley Redistribution increased substantially from 13% to 29%, while a large drop was seen for Delta/Richmond markets from 42% to 29% and BC interior markets from 35% to 23%. The largest proportional reduction from BC interior markets was Area #3 (from 11% to 5% of shipments) and Area #1 (from 15% to 11% of shipments).

The largest volume of manure shipped to the Fraser Valley Redistribution market is to the dairy industry. Generally, it is applied on owned or rented land at a distance that would make application of their dairy manure cost prohibitive. Manure delivered to compost markets is generally shipped out of the valley to Princeton and Ashcroft. Some problems were encountered this fall and winter with crop producer insecurity issues regarding environmental regulations and food safety, mainly in Delta. This issue is becoming more

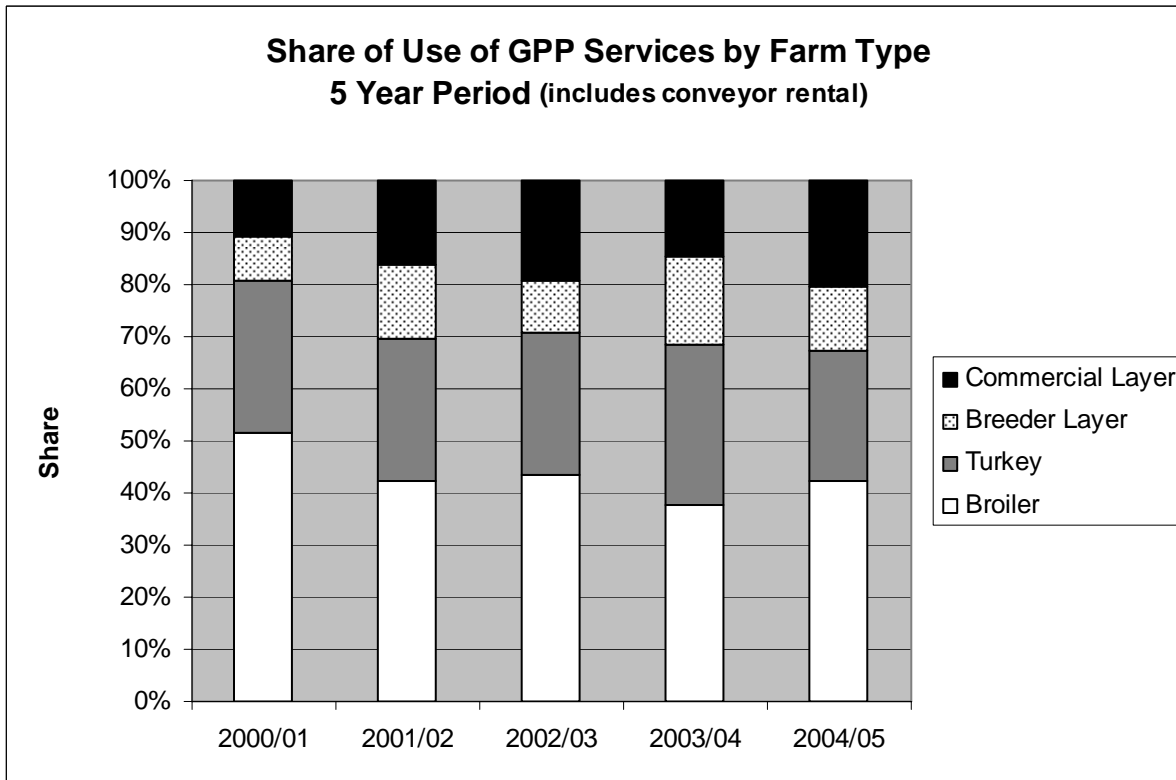
prominent in crop producers minds each year and will likely affect the volume of future shipments. One concern, is the reduction in manure shipments to the BC interior. Some trucking availability concerns hampered the ability of SPFG to ship to these areas. Presently, the need to acquire a backhaul for every load shipped to the interior may prove to be a major stumbling block to effective GPP hauling to the BC interior.



2.5 Types of Poultry Manure Shipped

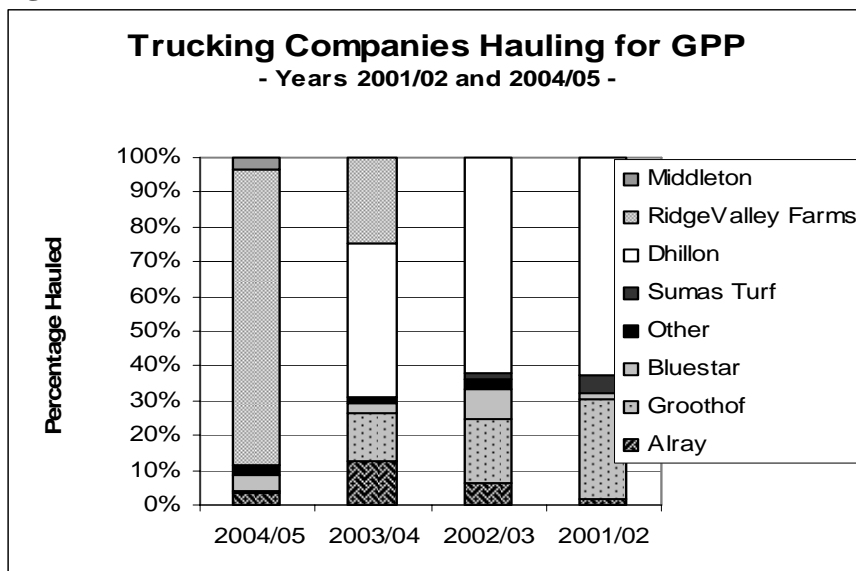
From Figure 4, broiler growers remain the largest users (38%) of the GPP, with turkey producers (25%) the second largest users. Over the last four years, there appears to be a division between layer farms and litter-based production systems; layer farms comprise about 30%, while broiler and turkey producers comprise about 70% of GPP service users.

Figure 4



3.0 Manure Hauling Contractors

Figure 5



During 2001/2002, the GPP utilized the services of about nine trucking contractors. As shown in Figure 5, the highest utilized for this year was Ridge Valley Farms. Dhillon Industries hauled the greater share of manure last year, but went out of business in the spring of 2004. Ridge Valley hauls to markets in the Fraser Valley and interior. Groothof, Bluestar, and Alray generally provide trucking services to the interior. Middleton is a new trucking company to the GPP this year, but it is unlikely to haul large amounts of manure; hauling for the GPP was considered a sidelining for them during the AI outbreak. For

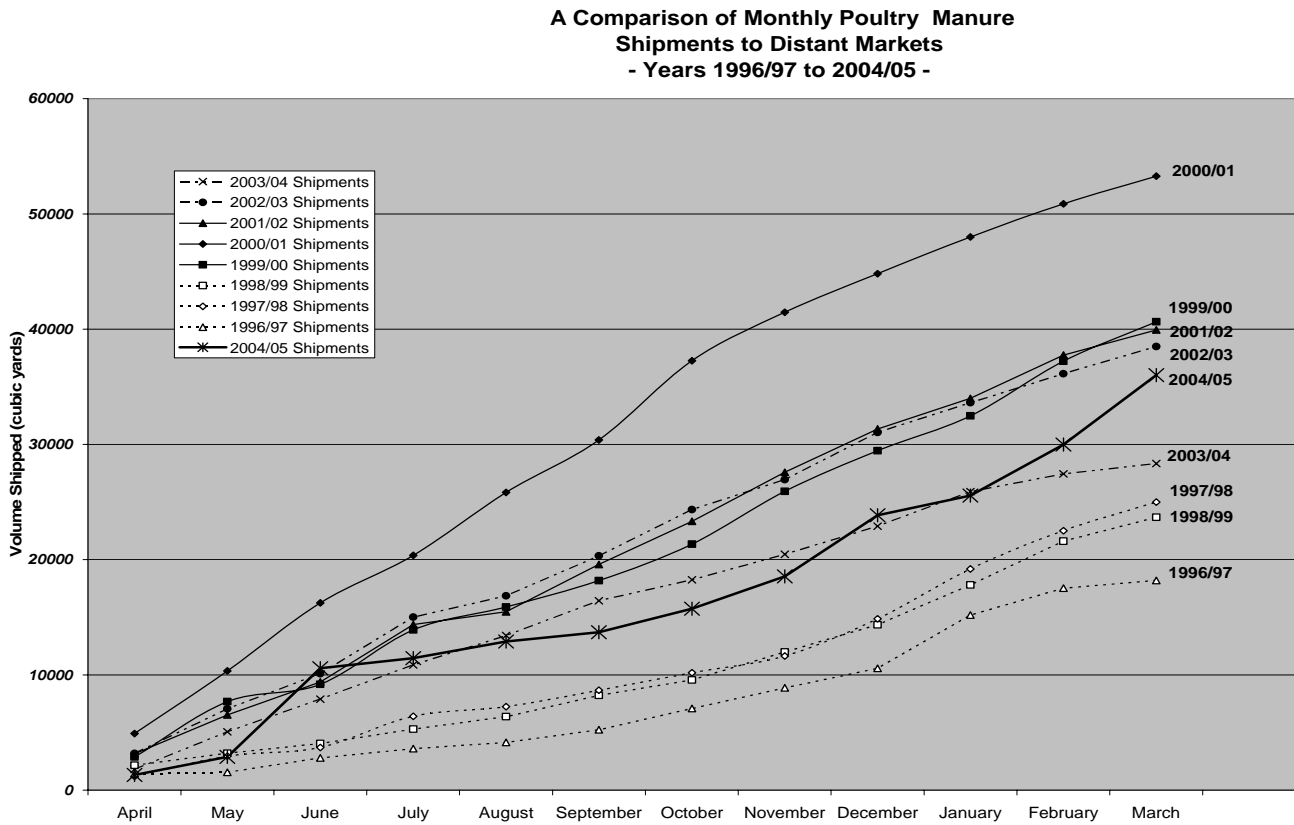
2004/05, Ridge Valley hauled the greatest volume for the year.

4.0 Historical Analysis

4.1 Year to Year Increase in Shipments to Distant Markets

In Figure 6, 1996/97 to 2004/2005 GPP shipments are identified and compared cumulatively. In 2000/01, overall shipment volumes to distant markets peaked, likely due to a constraint in local markets at that time. Shipments levels since then have seen an overall drop, although this year a slight increase was noted over last year.

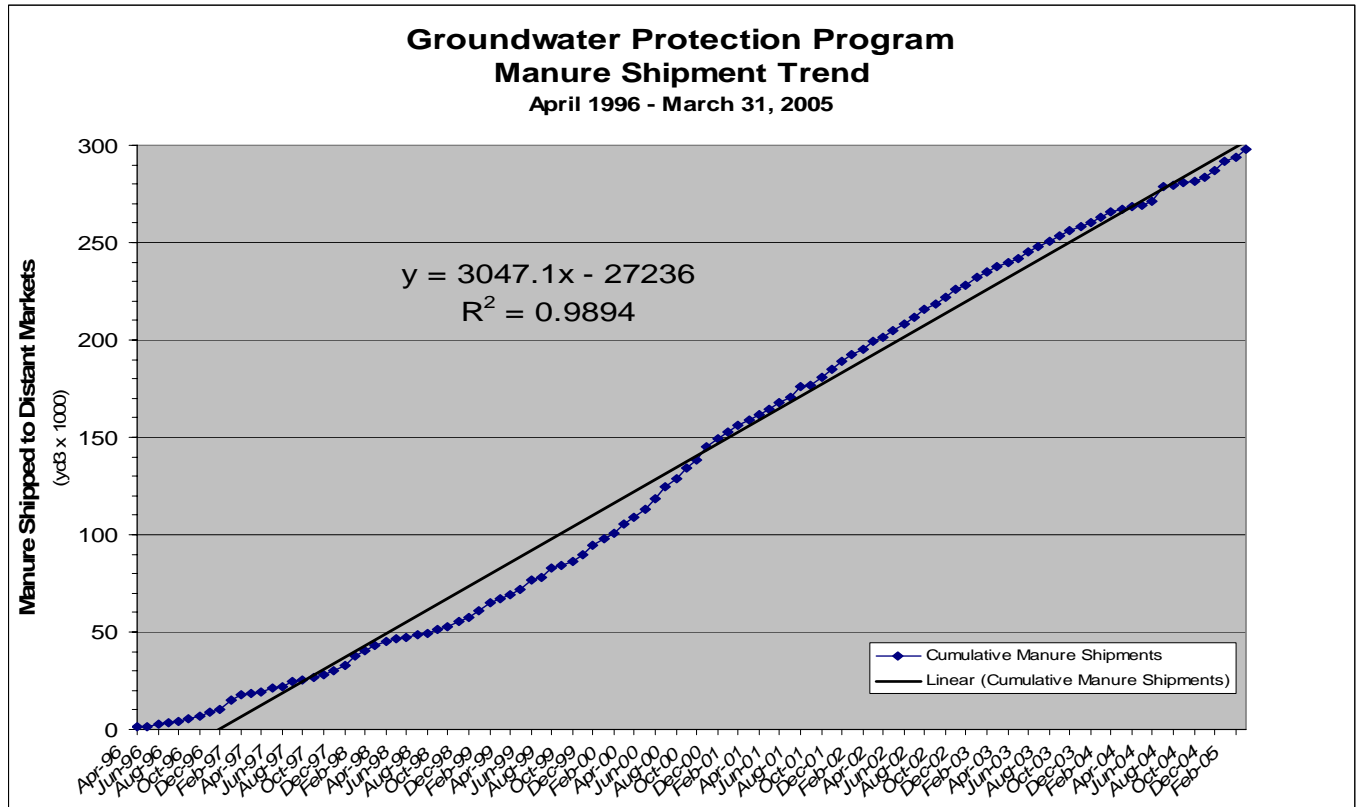
Figure 6



4.2 Overall Eight Year Pattern for Manure Shipments

To identify the overall year to year change in the manure shipment program to distant markets, data was assembled from the last nine years (1996/97 to 2004/2005). Figure 7 shows the actual cumulative shipments for this period along with a trendline.

Figure 7

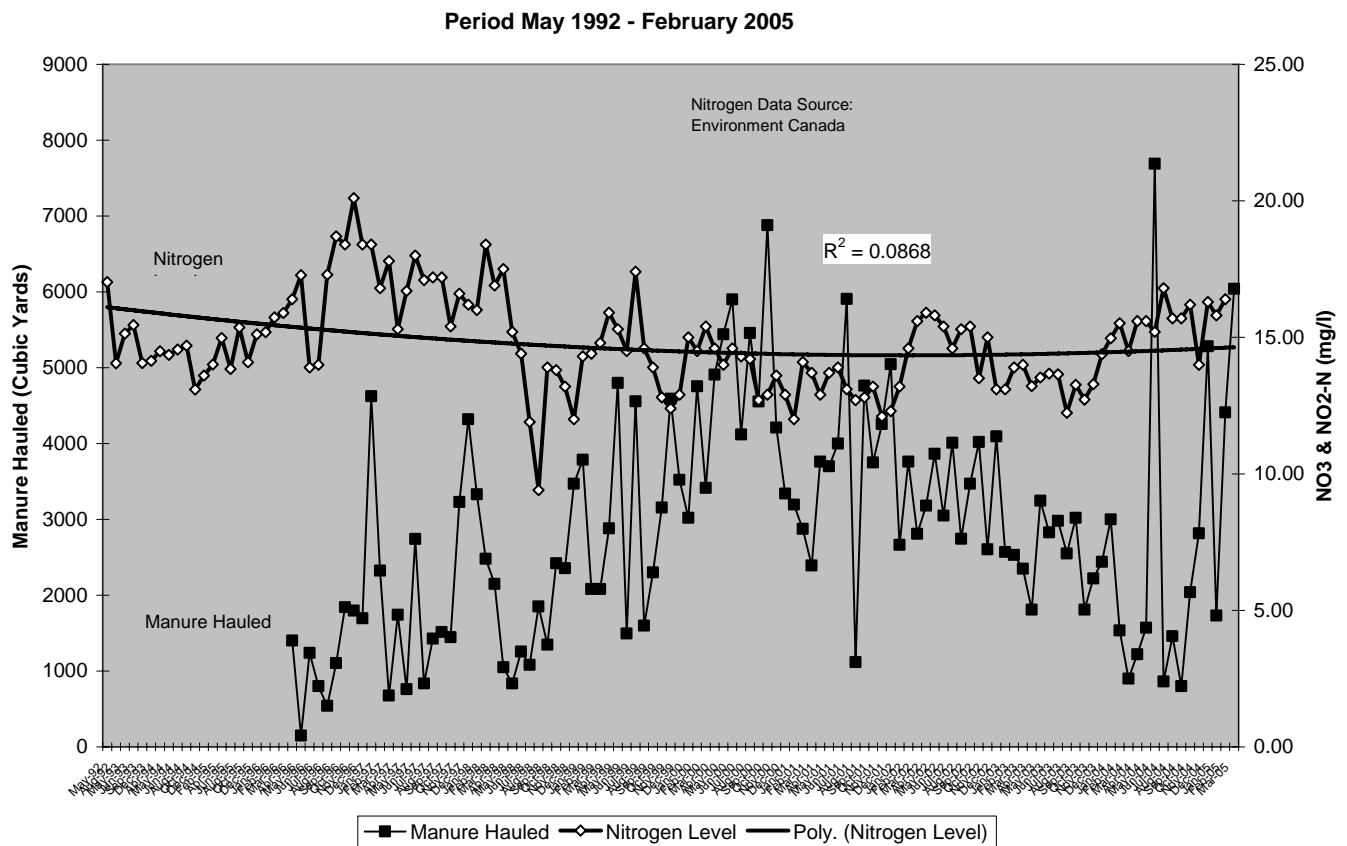


4.3 Abbotsford Aquifer Nitrate Level Trends and Fraser Valley Poultry Manure Hauled under the Groundwater Protection Program

From Figure 8, average Abbotsford Aquifer nitrogen levels seem to be on a slight increase for the last two years after being on a slight decline for several years previous. This increase in nitrogen levels, to some extent mirrors declining GPP manure shipments off the Abbotsford Aquifer. While for this year, there are some large monthly positive 'swings' in manure shipments, as reported earlier the overall trend for manure shipments off the Abbotsford Aquifer is one of a decrease.

Figure 8

Abbotsford Aquifer - Nitrate and Nitrite-N Level versus Poultry Manure Volume Hauled



5.0 Observations on GPP Operations

Manure market development continues but has been hampered due to use of GPP resources in other areas. During the AI outbreak, initially some, but later all SPFG resources (which include GPP resources) were expended on infected farms to ensure orderly and effective composting operations for a period of over three months.

At this time, two constraints predominate further development of the GPP hauling operations to the BC interior:

- a greater supply of broiler manure is needed to supply interior markets (markets prefer broiler litter over other types of poultry manure due to its high nutrient content both on a weight and volume basis, as well as the consistent physical and chemical makeup of the product)
- implementation of one-way hauling to the interior.

Together, a greater supply of broiler litter and the availability of one-way interior hauling will allow for a general opening up of interior markets to the Fraser Valley poultry industry. To do this, a consistent, increasing supply of broiler litter is needed (dry turkey litter is also in demand), along with financial means to be able to support the additional cost of returning a truck to the Fraser Valley empty.

6.0 Summary

This year, manure shipments out of the Abbotsford Aquifer and Central Fraser Valley to distant markets increased from 81% to 88% (about 5,000 cubic yards). However, shipments directly off the Abbotsford Aquifer decreased slightly over the previous year, likely due to the AI outbreak. The number of hauling events coordinated was lower this year at 75 (114 last year) while the average size of each event was larger than last year with an average of about 390 cubic yards per event.

Similar to last year, chicken producers were the largest users of GPP services, while turkey producers and both commercial and hatching egg producers used the services to a lesser extent. Proportion of use of GPP services has remained relatively consistent for the grouped hatching egg and commercial egg layer sectors as compared to the turkey and broiler producer sectors.

The largest proportion of manure was shipped to the Delta/Richmond (29%) and Fraser Valley Redistribution (29%) market areas, with the mushroom compost market increasing in importance. BC Interior market region shipments were down slightly this year.

Average Abbotsford Aquifer nitrogen levels appear to be on a slightly increasing trend while manure shipments have slightly decreased. Future progress for the GPP will require hauling a greater number of loads to the BC interior or alternate markets. At this time, there are no new alternate markets on the horizon.

The number of loads hauled to the interior this year was down slightly from last year. The two largest constraints to developing the interior for future marketing of Fraser Valley manure are:

- **Lack of back-hauling opportunities** – number of trucks generally, as well as availability for specific areas
- **Economic sustainability** – to date, generally speaking, there is no profit in hauling manure to the interior. After trucking costs, there is little, and in most cases no return from marketing manure to the interior.