

Sustainable Poultry Farming Group,
Abbotsford, B.C.

Groundwater Protection Program

2001/2002 Annual Report

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Groundwater Protection Program

2001/02 Annual Report

Acknowledgements

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1.0 Introduction

The Groundwater Protection Program (GPP) was initiated in the fall of 1995 with the construction of an on-farm conveyor system, built to reduce the high costs associated with transporting manure long distances. This year, a new conveyor was built, bringing our total complement to four conveyors.

Over the years, a significant increase in manure shipments has occurred (see Table 1). This year, an increase was noted for the proportion of shipments hauled to the BC Interior, while some reduction in manure hauling volumes to other distant markets was noted. Manure hauling was slightly less seasonal in nature, as shipments were generally spread throughout the year in a more consistent manner. As for last year, similar amounts of manure was hauled out of storage facilities, rather than directly out of poultry barns.

Table 1 Increase in Distant Market Manure Shipments from Year 1 (1995/96) to Year 7 (2001/02)

<i>Year of Operation</i>	<i>Shipment Volume</i>	<i>Shipment Period</i>	<i>Increase (adjusted)*</i>	
			<i>Over Previous Year</i>	<i>Rolling Average over preceeding years</i>
Year 1 (1995/96)	6,200 yd ³	8 months	NA	NA
Year 2 (1996/97)	18,200 yd ³	12 months	+ 96 %*	+ 96 %*
Year 3 (1997/98)	24,930 yd ³	12 months	+ 37 %	+ 67 %
Year 4 (1998/99)	23,675 yd ³	12 months	- 5 %	+ 43 %
Year 5 (1999/00)	40,640 yd ³	12 months	+ 72 %	+ 50 %
Year 6 (2000/01)	53,240 yd ³	12 months	+ 31 %	+ 46 %
Year 7 (2001/02)	40,105 yd ³	12 months	- 25 %	+ 34 %

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

2.0 Manure Hauling Activity

This year, a total of 150 poultry farm hauling events were coordinated (including rentals), with 139 of these events involving shipments of manure to distant or alternate markets (see Table 2). This year, the average manure handling event was 297 cubic yards, while ranging in size from 35 to 970 cubic yards.

Table 2 – Selected Hauling Event Statistics (cubic yards)

Year	Total # Events Coordinated	# Events to Distant Markets	Average Volume per Event	Minimum Volume per Event	Maximum Volume per Event
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 (includes conveyor rentals)

Shipping Arrangements	Distant Markets	Alternate Markets	Local Markets		Total
			CFV	UFV*	
	----- Cubic yards -----				
SPFG Coordinated	39,525	0	2,410	370	42,305
Farmer Handled (with conveyor Rental)	580	2,325	320		3,225
Total	40,105	2,325	2,730	370	45,530

* Total includes Chilliwack, Rosedale, Pitt Meadows, and Maple Ridge

From Table 3, a total of 45,530 cubic yards of poultry manure shipments were handled through use of the Groundwater Protection Program.

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 to alternate markets such as the soil bioremediation industry.

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.

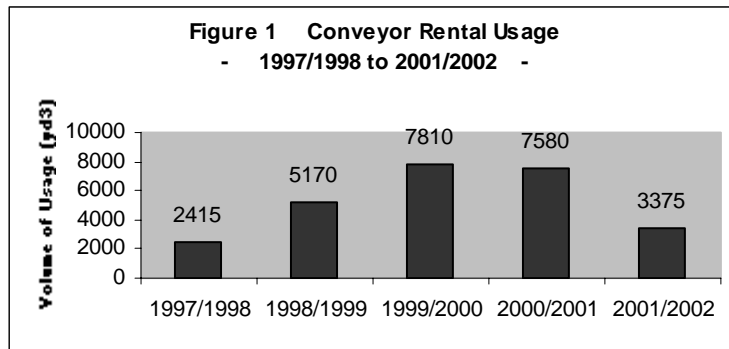


Figure 2 below identifies the usage of GPP conveyors for this purpose. From Figure 2, conveyor rentals peaked in 1999/2000, and have declined since then. This is likely due to the fact that a conveyor is now available for rent from a trucking company. As well, it appears there are fewer semi-local markets in which to haul manure. Thus manure that would

have been handled through a rental situation may now be hauled to a distant or alternate market. It is not felt that conveyors are decreasing in importance for manure handling on Fraser Valley poultry farms, rather the nature of use and sourcing of conveyors has changed.

2.3 Sources of Manure Shipped During 1999/2000

As identified in Table 4, most of the poultry farms which ship manure from the Fraser Valley to distant markets are either directly on the Abbotsford Aquifer (62%), or nearby within the Central Fraser Valley (25%). Together, both the Central Fraser Valley and Abbotsford Aquifer areas comprise 87% of shipments to distant markets. While the total amount of manure shipped off the Abbotsford Aquifer decreased in 2000/2001, the proportional amount shipped increased from 54% in 1999/2000 to 62% in 2000/2001.

Table 4 2000/2001 Manure Shipments to Distant and All Markets from Fraser Valley Areas

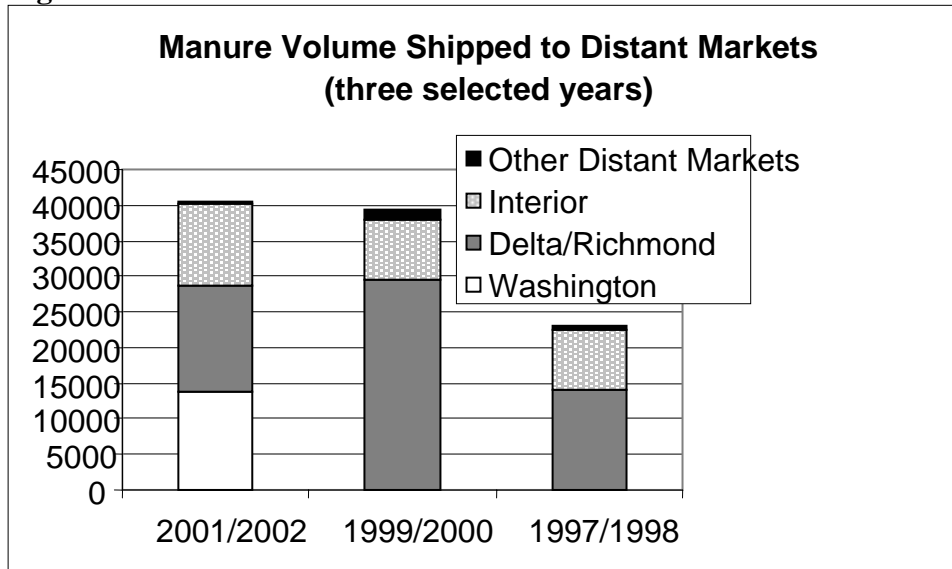
Source Area	Distant Markets		All Markets	
	- - - Cubic yards - - -			
	2000/2001	1999/2000	2000/2001	1999/2000
Abbotsford Aquifer	24,630 (62%)	28,735 (54%)	26,830 (59%)	30,925 (50%)
Central Fraser Valley	10,140 (25%)	20,045 (37%)	10,810 (24%)	21,480 (34%)
Upper Fraser Valley	1,740 (4%)	200 (ns)	1,970 (4%)	1,450 (2%)
Lower Fraser Valley	3,595 (9%)	4,690 (9%)	5,920 (13%)	8,680 (14%)
Total	40,105 (100%)	53,670 (100%)	45,530 (100%)	62,535 (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 2000/2001, 87% of shipments to distant markets likely reduce the amount of manure stored and spread on the Abbotsford Aquifer.

2.4 Destination of Manure Shipments

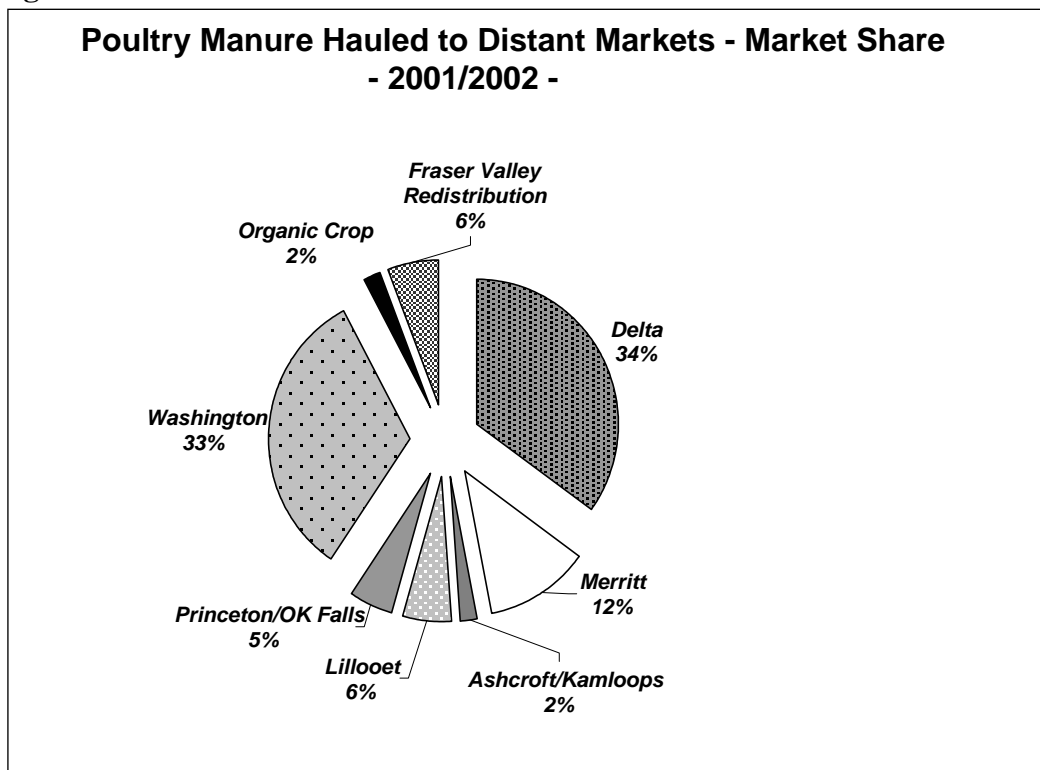
During the last seven years, distant or alternate markets have been dynamic in size and scope. Initially, the challenge was to lead the development of markets in, and ensure delivery of product to Delta crop producers. GPP peak shipments to Delta occurred in 1999/2000. During 2001/2002, shipments to Delta have decreased (see Figure 2), while shipments to the BC Interior and Washington have increased. This change in market is seen as a progressive move to continue developing markets within new areas and industries. After development of the Delta market through the GPP, this market is seen to be well-recognized and supplied by local contractors.

Figure 2



During the 2000/2001 year, the SPFG decided that a wise strategy would be to move manure further into previously undeveloped markets. These markets include BC Interior ranches, organic crop producers, composting, and soil bioremediation. Figure 3 identifies the distant market share for each market type or region. From Figure 3, efforts at maximizing less developed markets are showing success as both the proportion of both BC Interior shipments and Washington (composting) shipments have increased. Future work will involve further increasing this trend.

Figure 3



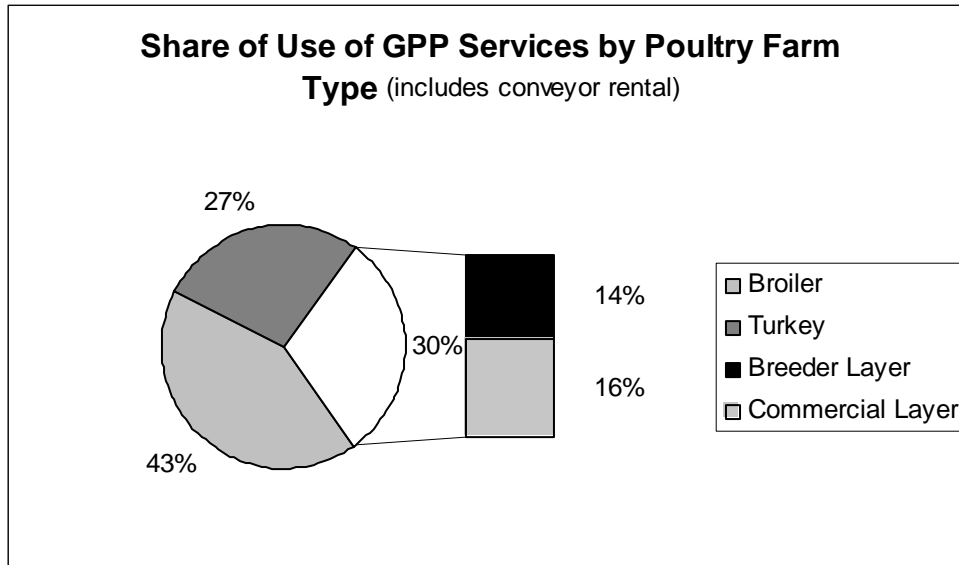
In 2001/2002, both Delta and Washington market regions held the greatest market share. The BC Interior captured 27% market share, of which new markets in Princeton, Lillooet, and Kamloops played an important role. Market share for Organic crop producers was slightly decreased, from

3% previously, to 2% in 2000/2001. This decrease was in part due to restrictions to use of manure from poultry operations in which the flock may have been fed GMO feeds (a European market regulatory concern).

2.5 Types of Poultry Manure Shipped

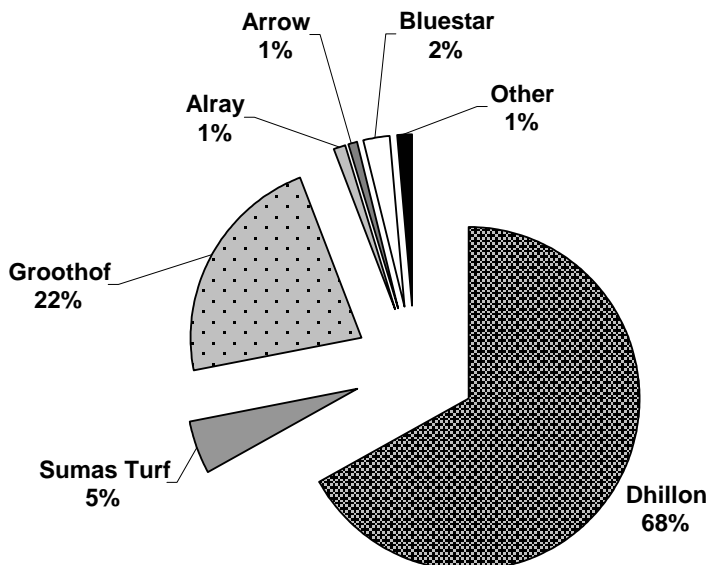
From Figure 4, chicken producers comprised the largest proportion (43% - down from last year at 52%) of conveyor users in 2001/2002, followed by Turkey producers at 27% (last year 29%). However, both commercial egg (16% over 11%) and breeder layer manure (14% over 8%) categories have increased substantially.

Figure 4



3.0 Manure Hauling Contractors

Fig. 5 Share of Manure Hauled by Trucking Contractors during 2001/2002 GPP Operations



During 2001/2002, the GPP utilized the services of about nine trucking contractors. As shown in Figure 5, the highest utilized for the year (similar to last year) were Dhillon Industries and Groothof Trucking.

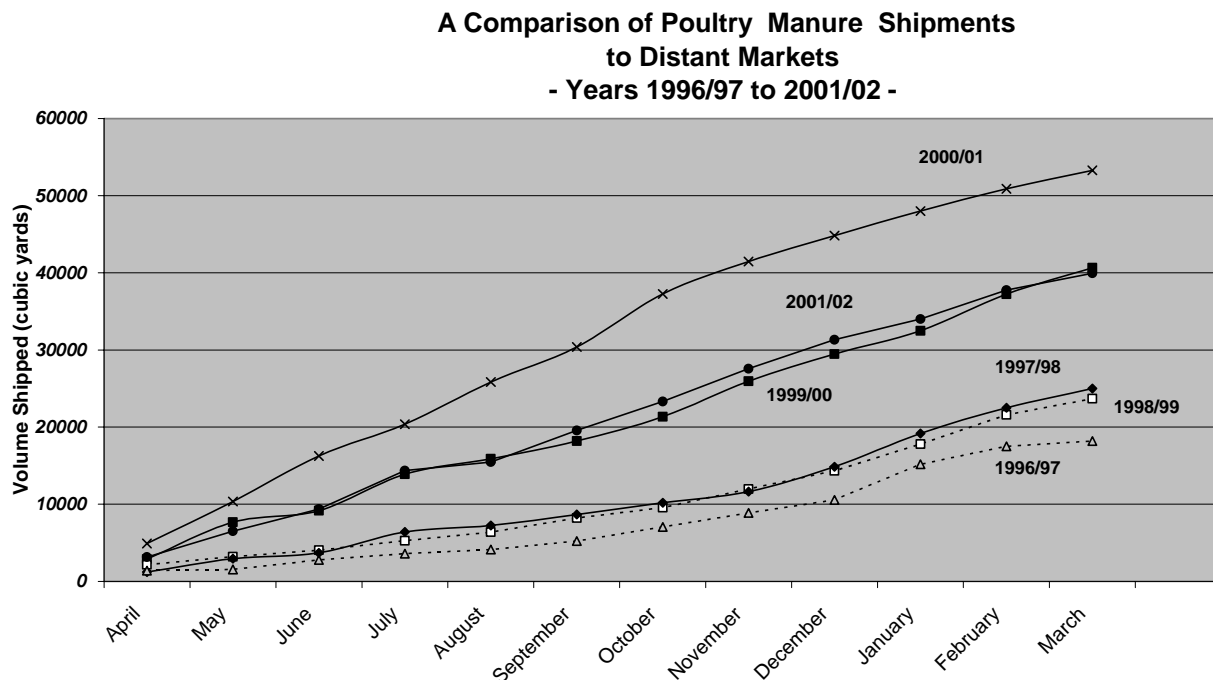
4.0 Historical Analysis

4.1 Year to Year Increase in Shipments to Distant Markets

In Figure 6, 1996/97 to 2001/2002 GPP shipments are identified and compared cumulatively. In 1998/99, overall shipment volumes to distant markets were down slightly, but a trend toward shipping manure on a more regular and less seasonal basis can be seen. This trend continues in the following years with manure shipments increasing in regularity i.e. tending to be less seasonal in nature.

In examining and comparing manure shipments between each year, a repeating pattern appears. Year 2 (1996/97) and years 4 and 5 were expansion periods for manure shipments, while years 4 and 7 were periods of shipment contraction. To date, there has never been a two year period of contraction. Therefore, it would seem plausible that this year will see an increase in shipments to 2000/01 levels or greater.

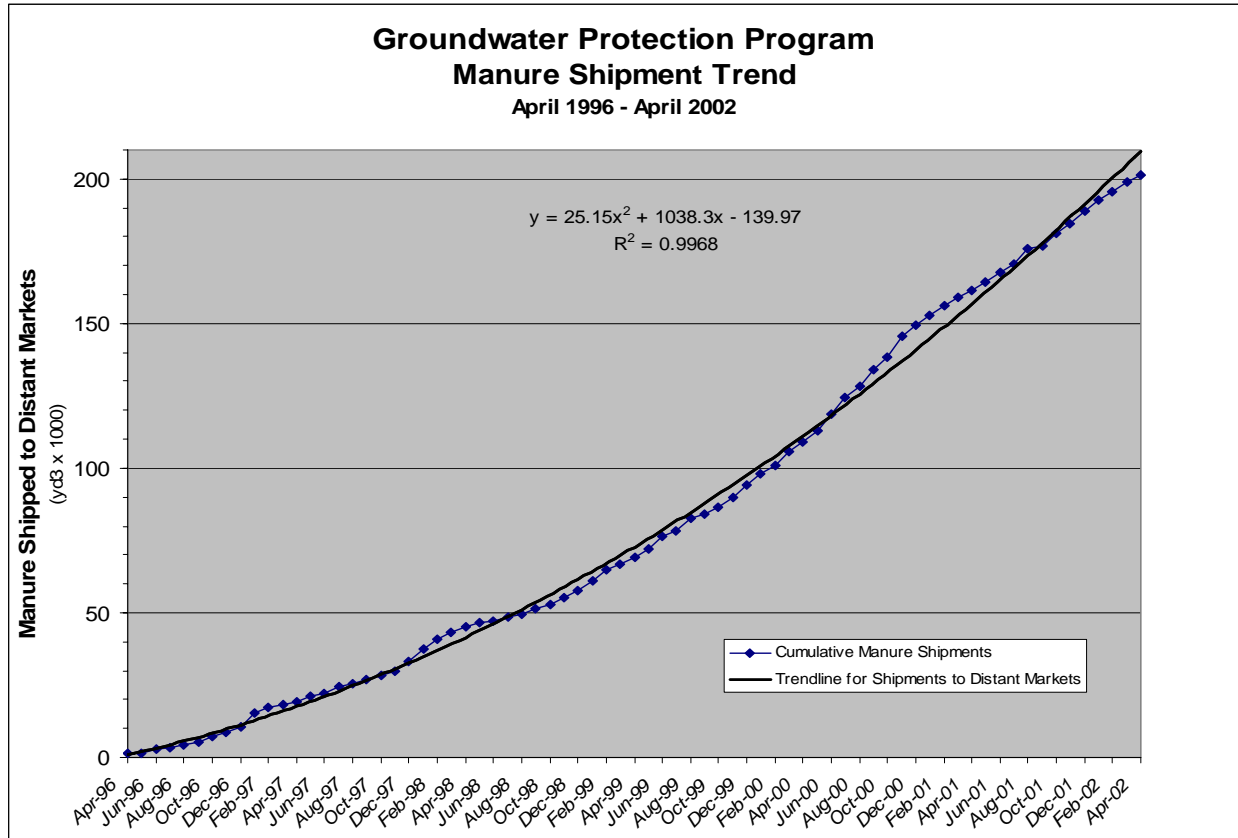
Figure 6



4.2 Overall Four Year Increase in Manure Shipments

To identify the overall expansion of the manure shipment program to distant markets, data was assembled from the last six years (1996/97 to 2001/2002). While shipments occurred in 1995/96, they were limited in volume and deemed not of significance for inclusion. Figure 7 shows the actual cumulative shipments for this period, as well as an imposed trendline ($y = 25.15x^2 + 1038.3x - 139.97$ $R^2 = 0.9968$). While total manure shipments are slightly down this year, the overall trend is for increasing shipments. Even with the effect of the peaks and troughs, a trendline value ($R^2=0.9968$) suggests an increasing trend for future shipments.

Figure 7



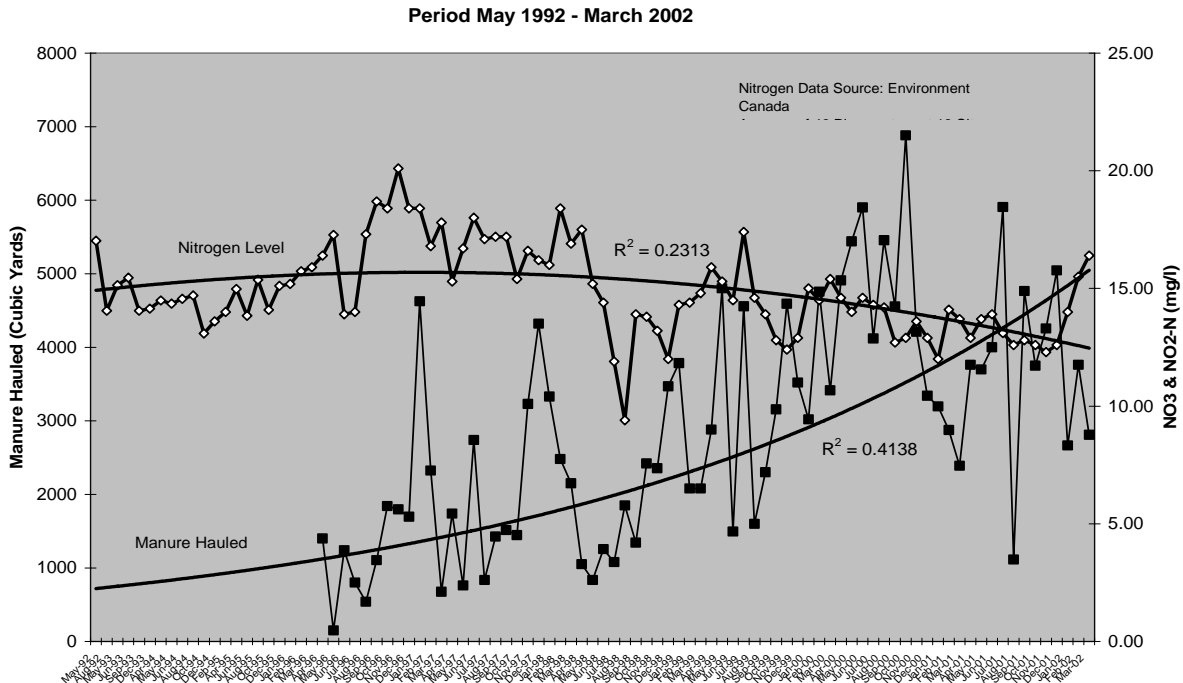
4.3 *Abbotsford Aquifer Nitrate Level Trends and Poultry Manure Hauled under the Groundwater Protection Program*

Figure 8 shows the relationship between average groundwater nitrate levels (Environment Canada sampling data for the period May 1992 to March 2002) and poultry manure shipments off the Abbotsford Aquifer for the period April 1996 to March 2002.

From Figure 8, nitrate level trends continue to decrease as manure shipment trends increase. Further development of the GPP and shipments off the Abbotsford Aquifer should continue this positive trend.

Figure 8

Abbotsford Aquifer - Nitrogen Level versus Poultry Manure Volume Hauled



5.0 Projected Need for the GPP

At this time, GPP requirements have been met. In the GPP 2000/01 Annual Report, it was suggested that the SPFG should consider building a fourth conveyor. Since then, a fourth conveyor has been added to the fleet. The fourth conveyor will enhance repair and maintenance operations, increase availability and effective use of conveyors.

6.0 Summary

Since Year 1, the overall manure hauling trend to distant markets has continued to increase, however, manure shipments for 2001/02 have decreased. While the overall amount of manure handled decreased, the number of hauling events coordinated increased by 12 events to 150 with a corresponding decrease in manure volume per event of 68 to 297 cubic yards. During 2001/02, chicken producers became the largest users of GPP services (43%), while turkey producers (27%) and both commercial (16%) and hatching egg producers (14%) used the services to a lesser extent.

During 2001/02 several market changes were noted. Delta and Washington market regions are now similar in size (each about 33-34%) and the BC interior region has increased to 27%. A further expansion in trucking connections has increased our ability to match poultry farms to distant markets. A fourth conveyor is now in operation to increase flexibility in meeting loading requirements for product to distant markets and for rental purposes.

Groundwater nitrate levels continued to decrease during 2001/02 and the impact of manure shipments to distant markets on Abbotsford Aquifer levels appears positive.