

Sustainable Poultry Farming
Group, Abbotsford, B.C.

Groundwater Protection Program

1999/2000 Annual Report

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Groundwater Protection Program

1999/00 Annual Report

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 first year was dedicated to testing the workings of the conveyor and the feasibility of a program to ship manure directly from poultry farms to distant markets.

After initial success in the first year, the focus for the second and third years was the expansion of the Groundwater Protection Program. Building on the success achieved by the end of year 1, a significant expansion was possible (see Table 1). This expansion occurred in the following ways:

- increase in the number of poultry and crop producers involved in shipping and purchasing manure
- increase in the volume of manure shipped
- increase in the capacity of the hauling system
- increase in the flexibility and efficiency of the loading system through some minor equipment alterations

In the first two years, manure hauling arrangements were made with little advance notice and were generally seasonal, with the majority of manure hauling occurring in the late fall and winter periods. With the advent of the GPP Membership Program option in the fall of 1997, seasonal effects have been reduced.

Table 1 Increase in Distant Market Manure Shipments from Year 1 (1995/96) to Year 5 (1999/00)

<i>Year of Operation</i>	<i>Shipment Volume</i>	<i>Shipment Period</i>	<i>Increase (adjusted)*</i>	
			<i>Over Previous Year</i>	<i>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 %

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

1.1 GPP Membership Program

The Sustainable Poultry Farming Group began a membership program for the GPP early in 1998 with the following objectives:

- Increase manure hauling activity in the spring and summer to reduce the strain on the system from trying to haul large volumes of manure during the fall and winter period
- Reduce hauling cost to poultry producers who make a commitment to the GPP
- Provide manure supply stability to the hauling system.

To promote the hauling of poultry manure all year, a membership program with a reduced fee structure was developed. Since inception of this program last year, an increase in manure shipments has been noted year around. A further extension of this program, has been offered to poultry producers. The extension offers poultry producers free use of the SPFG conveyor for manure hauled year around out of their covered manure storage facility. Below, Table 2 shows change in the number and type of participants in the GPP, both for last year and this year

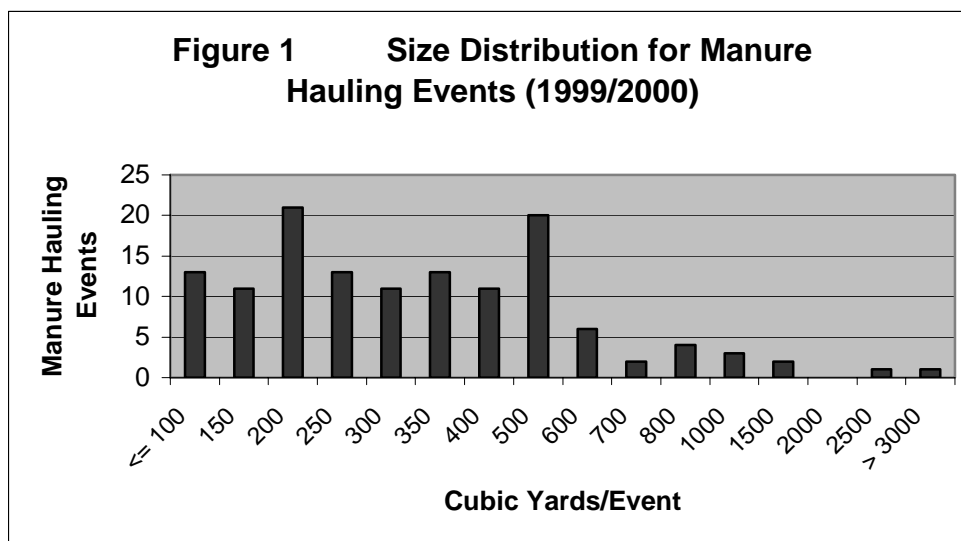
Table 2 Number of Farms Participating in GPP – Members and Non-members 1999/00 vs. 1999/98

Membership Program Participants				Non-Member Participants	
Without Storage		With Storage		Without Storage	
1999/00	1998/99	1999/00	1998/99	1999/00	1999/98
9	7	4	1	38	28

From Table 2, it appears interest is increasing substantially in numbers of participants both as members and non-members with substantial involvement from producers with storage facilities. Non-Member Participants generally ship manure only during the fall and winter periods.

2.0 Manure Hauling Activity

This year, a total of 138 poultry farm hauling events were coordinated, with 126 of these events involving shipments of manure to distant or alternate markets. This year, the average



manure handling event was 365 cubic yards, ranging in size from 80 to 3640 cubic yards. Figure 1 below displays further the relationship between the amount of

manure handled (including rental situations) and the number of events which occurred in 1999/2000.

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

Shipping Arrangements	Distant Markets	Alternate Markets	Local Markets		Total
			CFV	UFV	
----- Cubic yards -----					
SPFG Coordinated	40,460	370	290	0	41,300
Farmer Handled (with conveyor Rental)	0	2,700	3,400	760	6,860
Total	40,640	3,070	3,690	760	48,160*

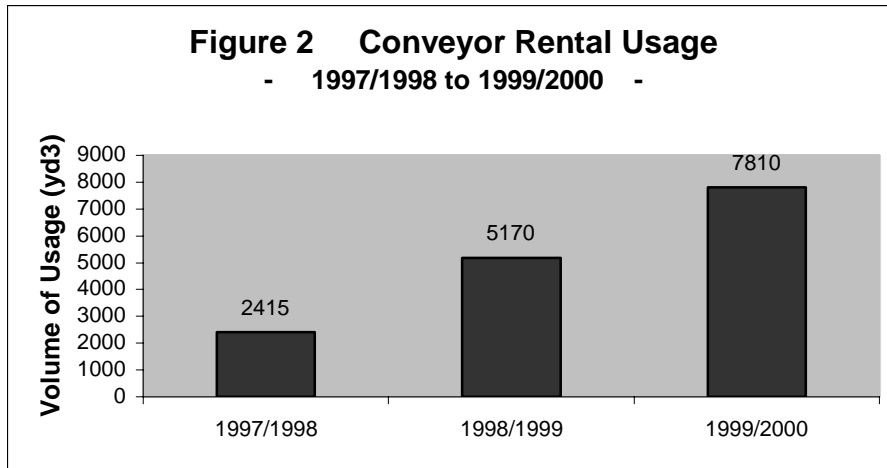
* Total equals 48,460 when conveyor rental to Unruh Cleanout (300 cubic yards) is included

From Table 3, a total of 48,160 cubic yards of poultry manure shipments were handled through use of the Groundwater Protection Program. This amounts to an increase of about 17,950 cubic yards or 59% (30,245 in 1998/99) over the amount handled last year.

GPP services, as in other years, also 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 topsoil industry.

2.2 Conveyor Rental Usage

GPP conveyors are available for rental. 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 which has its' own larger trucks. Figure 2 below identifies the increase in use of GPP



conveyors for this purpose. From Figure 2, over the three year period identified, conveyor rentals have increased greater than 300 %, while over last year, the amount handled increased 51%. Clearly, these conveyors are increasing in

importance for manure handling on Fraser Valley poultry farms.

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 are either directly on the Abbotsford Aquifer (45%), or nearby within the Central Fraser Valley (50%). Together, both the Central Fraser Valley and Abbotsford Aquifer areas comprise 95% of shipments to distant markets.

Table 4 1999/2000 Manure Shipments to Distant and All Markets from Fraser Valley Areas

Source Area	Distant Markets	All Markets
	- - - Cubic yards - - -	
Abbotsford Aquifer	18,500	21,510
Central Fraser Valley	20,210	21,560
Upper Fraser Valley	1,650	2,410
Lower Fraser Valley	280	2,980
Total	40,640	48,460

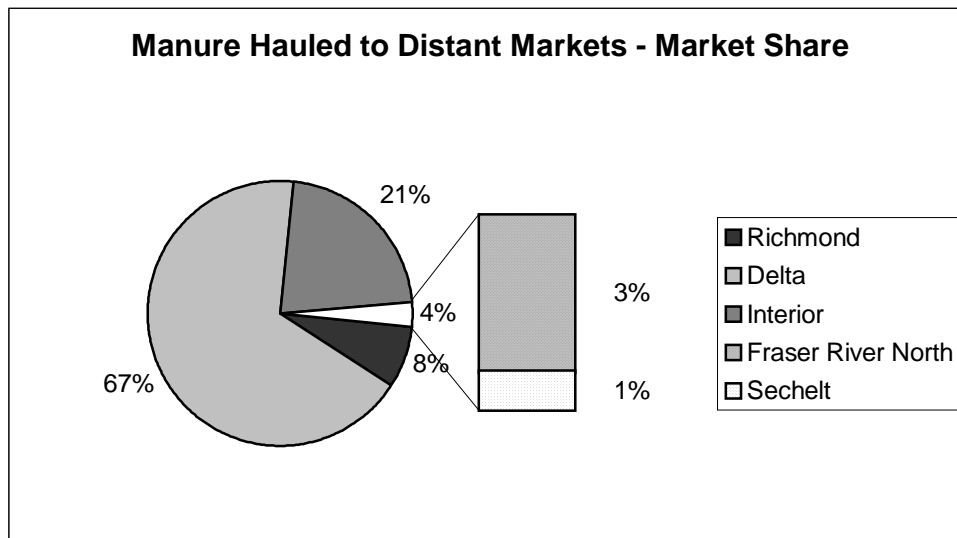
Since shipments originating in the Central Fraser Valley are considered as reducing the total amount of poultry manure spread on the aquifer area, then one could consider that 95 % of shipments to distant markets likely reduce the amount of manure stored and spread on the Abbotsford Aquifer.

2.4 Destination of Manure Shipments

Figure 3 shows the destination market area for GPP shipments of poultry manure during 99/00. Lower Mainland destinations are Delta and Richmond while Interior shipments include Merritt, Cawston, Naramata, and Ashcroft. Shipments also identified went to Sechelt and Pitt Meadows. Shipment share to Delta (67%) has increased over last year's share (54%).

A substantial amount of manure was again hauled to the organic production industry. As this industry expands, an increase in shipments is expected.

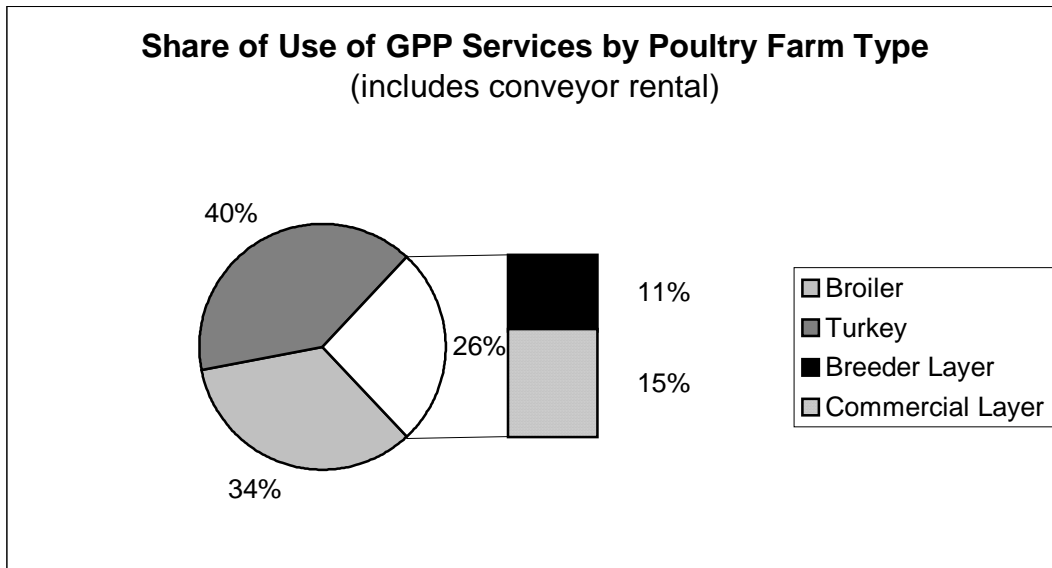
Figure 3



2.5 Types of Poultry Manure Shipped

From Figure 4, Turkey manure comprised the largest proportion (40% - down slightly from last year at 41%) of manure shipped to distant markets in 1999/2000, followed by Chicken Broiler manure at 34% (last year 38%). However, both commercial egg (15% over 11%) and breeder layer manure (11% over 10%) categories have increased slightly.

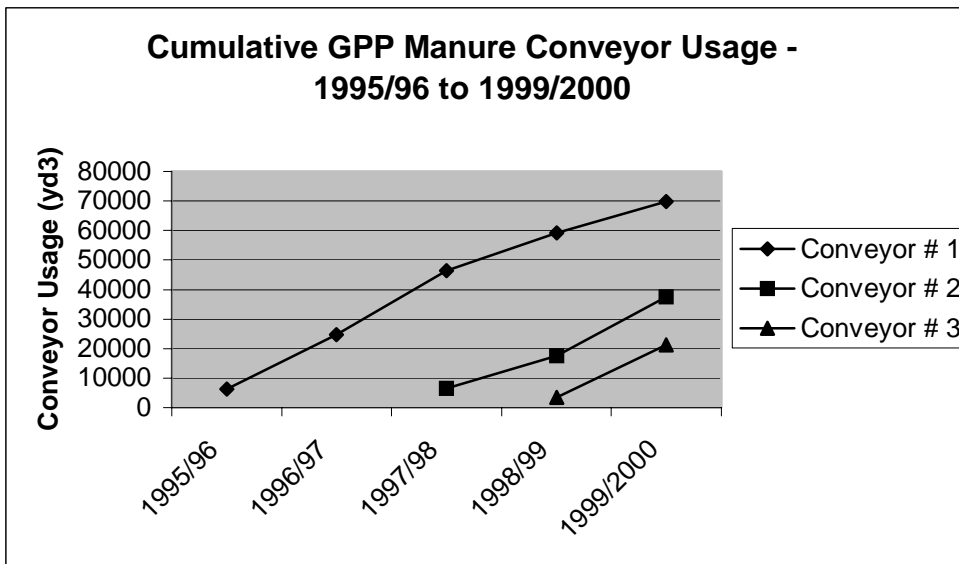
Figure 4



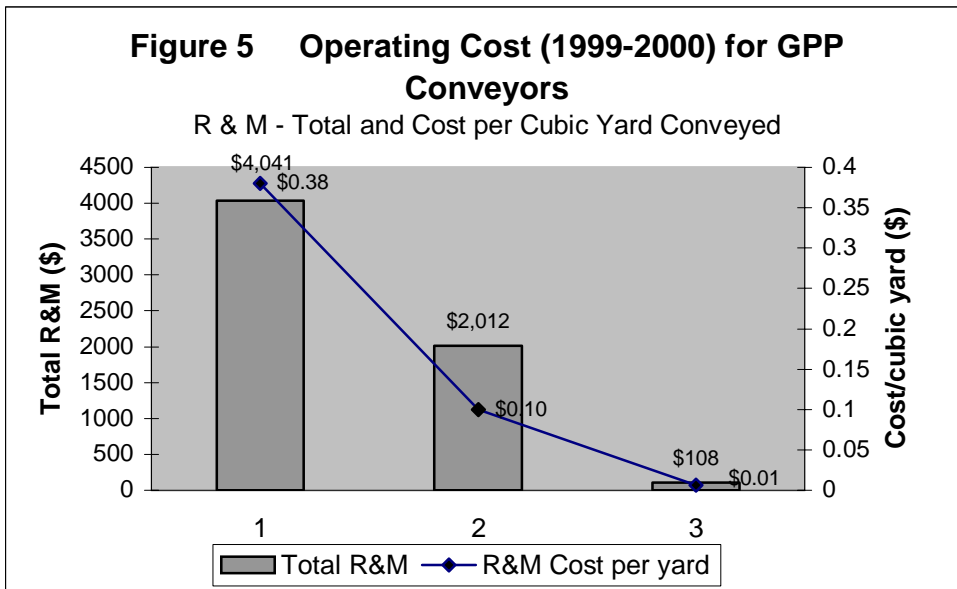
3.0 Conveyor Operating Cost

The first conveyor was put into operation in October 1995, second in January 1997, and third in February 1999. Figure 4 identifies the cumulative amount of manure that has been handled by each machine since each was put into operation.

Figure 5



In Figure 5, a snapshot comparison is made between the three conveyors showing the operating cost for each conveyor in terms of total cost for the 1999/2000 operating year and that cost divided by the amount of manure handled by each conveyor. Conveyor #1, now in operation for about 4.5 years (about 70,000 cubic yards) expectedly shows the highest operating costs (\$4041/yr, \$0.38/cubic yard), while Conveyor #2 (\$2012/year, \$0.10/cubic yard) and Conveyor #3 (\$108/year, \$0.01/cubic yard) showed substantially decreasing costs. It should be noted that Conveyor #3 was still under warrantee for ten months of the twelve month period examined. It

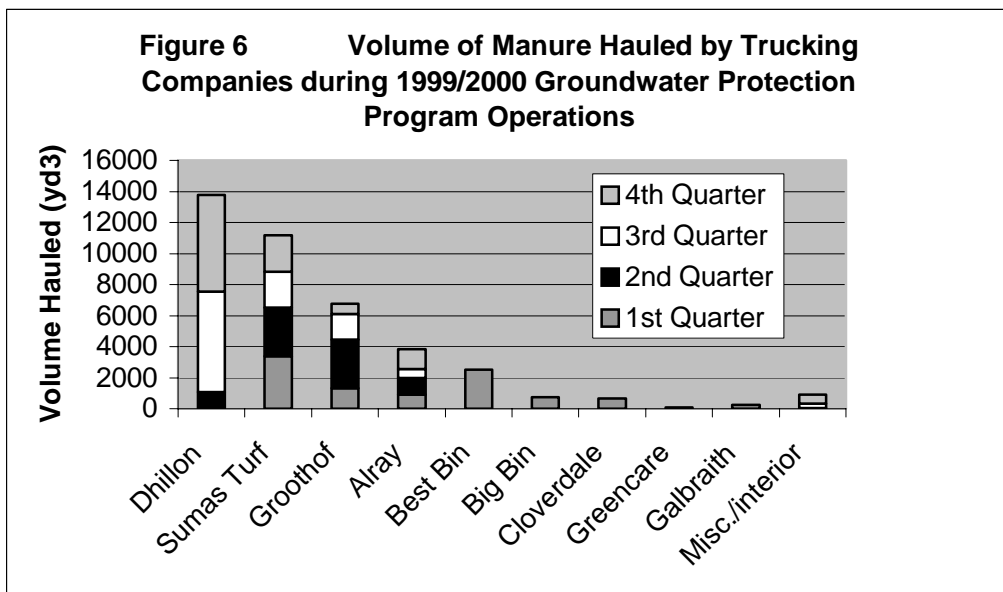


is felt that Conveyor #1 reflects typical medium term operating costs. For long-term costs, a figure of \$0.05-\$0.08 should be added to take into account wear and tear on the engine and belt, giving a total operating cost of \$0.43-\$0.46 per cubic yard of manure handled.

To convert the yardage handled by the conveyor to hours of operation, a conversion figure of about 50 cubic yards per hour seems appropriate. Using this figure, Conveyor #1 has operated for about 1400 hours.

4.0 Manure Hauling Contractors

During 1999/2000, the GPP utilized the services of about twelve trucking contractors. As shown in Figure 6, the highest utilized for the year were Dhillon Industries, Sumas Turf



Farms, Groothof Trucking, and Alray Shavings. By quarter, Sumas Turf Farms and Groothof Trucking were highest utilized for quarters #1 and #2. However,

for quarters #3 and #4, Dhillon Industries provided the greatest amount of trucking services. The main reason for the third and fourth quarter results were a decrease in trucks available through Groothof Trucking (to Merritt), and a decision to reduce the GPP reliance on trucking services provided by Sumas Turf Farms. Alray Shavings provides trucking services to 'organic growers' in the Princeton/Keremeos area.

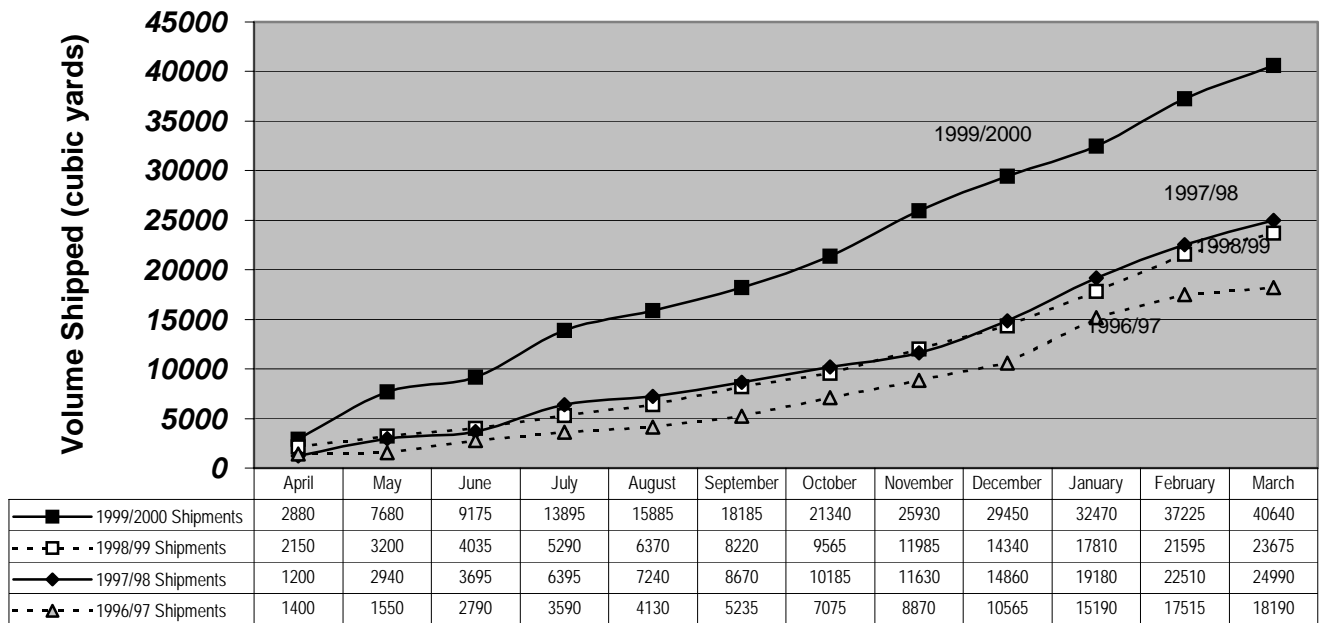
5.0 Historical Analysis

5.1 Year to Year Increase in Shipments to Distant Markets

In Figure 7, 1996/97 to 1999/2000 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. For 1999/2000, manure shipment volumes to distant markets substantially increased (23,675 to 40,640 cubic yards – a 72% increase). Along with this increase, manure shipments are increasing in regularity i.e. tending to be less seasonal in nature. The expansion of this trend is important for the GPP, from an efficiency standpoint. When manure is hauled evenly throughout the year, coordination and availability of trucking services and loading infrastructure are optimized.

Figure 7

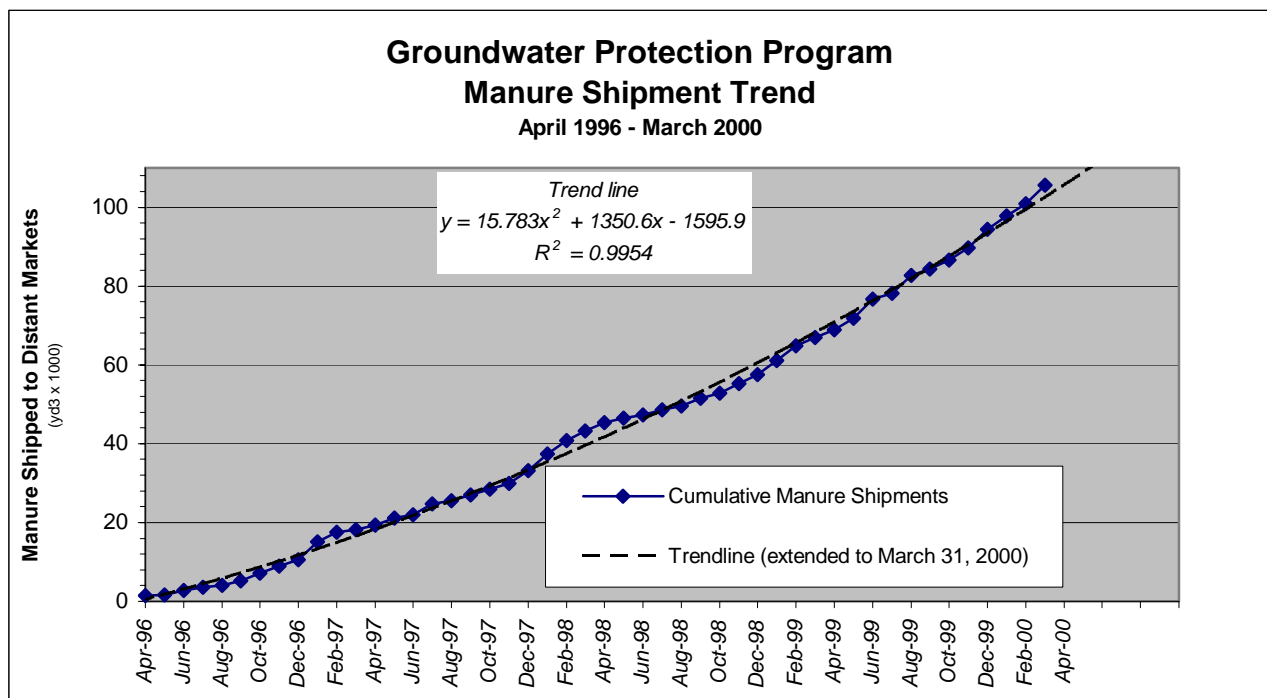
**A Comparison of Poultry Manure Shipments to Distant Markets
- Years 1996/97 to 1999/2000 -**



5.2 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 four years (1996/97 to 1999/2000). While shipments occurred in 1995/96, they were limited in volume and deemed not of significance for inclusion. Figure 8 shows the actual cumulative shipments for this period, as well as an imposed trendline ($y = 15.783x^2 + 1350.6x - 1595.9$ $R^2 = 0.9954$). Through mirroring the increased shipments to date, the trendline suggests an increasing trend for future shipments in the amount of about 16,000 cubic yards, potentially increasing shipments to approximately 57,000 cubic yards.

Figure 8



6.0 Projected Need for the GPP

GPP conveyors have been kept busy this year. At times, this situation delayed maintenance and repair operations. The GPP at this time should consider building a fourth conveyor based on the following information (some extracted from this report):

- The 3 GPP Conveyors are now operating at peak efficiency
- Manure shipment trends suggest a substantial increase in conveyor usage
- Conveyor rental usage has increased substantially which will likely continue
- Should a conveyor breakdown occur, there is little reserve capacity in which to rely.

7.0 Summary

Since Year 1, manure hauling to distant markets continues to increase at an accelerated rate. Markets and marketing areas have increased, along with the number of poultry producers and/or farms involved. Total amount of manure shipped to distant markets increase substantially (72%) in 1999/2000 while the overall amount of manure handled and the number of hauling events coordinated increased by about 17,950 cubic yards and 41 events. Turkey producers (40%) remain to be the greatest users of the GPP and the services it provides, while chicken producers (34%) and both commercial and hatching egg producers (26%) use the services to a lesser extent.

The GPP membership program has created a greater security for manure supply. An increase in membership to 13 poultry farms has made servicing distant markets easier and more flexible by being able to supply markets all year.

Delta remains the largest individual market area and has again expanded in 1999/2000. Increased trucking connections have expanded our ability to match poultry farms to distant markets. A fourth conveyor is suggested to meet increased demand by poultry producers using the conveyors for shipping to distant markets and for rental purposes.