Long Point and its associated watershed and creek are considered to be one of the “reference or control” watersheds of the SUNY Brockport/USDA sponsored watershed study. Reference watersheds refer to a group of watersheds that were not provided any new management programs through Nate Herendeen and Cornell Cooperative Extension. Extensive liquid manure spreading occurred during the week of 14 March 2005 on fields located in Long Point Watershed (above and below Gray Farm, North of Rt. 32) but now farmed by the Meyer’s (Figure 1). SUNY Brockport was alerted of this spreading on frozen ground and snow by Dick Davin on 14 March 2005.

**Field Notes of Sarah Wasson:** I was unable to directly observe on 14 March 2005 the spreading on the Gray Farm field the furthest west from Conesus Lake (Figure 1) due to the distance of the field from the road. The second field, below Gray Farm and closest to Conesus Lake, was also spread with manure (Figure 1). The western edge of the field is bordered with a tributary from Long Point that flows south and under Route 32. The northern edge of the field is bordered with trees and the edge of Sand Point Watershed. The field slopes towards the Long Point Tributary and the northern edge of the field. The manure can be seen on top of the field between the stalks of dead corn (Figures 4-7). Large numbers of geese were not observed (Figures 3-7).

Manure spreading clearly stopped 100 ft away from the Long Point Creek as snow near the stream had not melted (Figure 7), unlike the areas where the manure was spread where no snow was present. Little to no run off was observed from the field into the tributary. The smell of manure was strong.

**Notes from Dick Davin (see attached email below, Appendix A):**

Apparently, the Meyer’s chose not to inject manure because the ground was frozen. This is in accordance with recommendations from the Agriculture Consulting Service (ACS) and their Agriculture Plan for the Meyer’s land. The ACS consultant indicated that winter spreading was an acceptable practice on certain soils, and Meyer’s farm has been doing an excellent job in complying with their directives. Amount of manure spread depends on the nitrogen and phosphorus index of the soils.

Samples were collected by D. Davin for 21 days from a tributary of Long Point Gully on Route 32 adjacent to the Gray Farm and from the monitoring station on West Lake Road (Figures 1, 4, 7).
Analysis (Tables 1 to 6, Figure 2):

We do not know when spreading of manure was initiated on the Long Point watershed of Conesus Lake. At the monitoring station on West Lake Road, total phosphorus (TP) (range 36 to 41 µg/L) and total Kjeldahl nitrogen (TKN) (range 322 to 341 µg/L) concentrations (Table 2 and Figure 1) from 16 to 18 March 2005 (Table 2), all days with no rain, were similar to non-event concentrations earlier in February 2005 (TP range = 26 to 38 µg/L; TKN range = 230 to 420 µg/L) (Table 3). With no rain to wash materials off the watershed, these results are expected. However, as has been previously discussed in many Livingston County reports (Makarewicz et al. 1991, 2002, Makarewicz and Lewis 1999, Lewis 2004), these agriculture-dominated watersheds are rain sensitive. On 20 and 21 March, a small amount of rain occurred (0.12 inches). Concentrations of TP, TKN and total suspend solids (TSS) jumped dramatically by 170% for TP (from 41.0 to 111.4 µg/L), by 450% for TSS (from 11.5 to 65 mg/L) and by 20% for TKN (from 341 to 406 µg/L). Concentrations of all parameters measured dropped when the rain stopped. Once again on 24 March and 29 March, small amounts of rain lead to increases in TP, SRP, TSS, TKN and nitrate. The 2.15-inch rainfall of 2-4 April further demonstrated how sensitive these watersheds are to rain. Increases of over a 700% were observed at the Route 32 site just downstream from the Gray Farm for TP, SRP and TSS; for TKN increases of greater than 85% were observed. Respectively, these increases were as follows: total phosphorus (24.1 to 209.7 µg P/L), soluble reactive phosphorus (3.9 to 53.9 mg/L), total suspended solids (4.2 to 76.0 mg/L) and total Kjeldahl nitrogen (610 to 1140 µg N/L). Regression analysis indicated significant correlations between discharge and TP ($r^2 = 0.46$), TKN ($r^2 = 0.99$) and TSS ($r^2 = 0.39$). The very strong relationship between organic nitrogen (TKN as an indicator) and discharge strongly suggests that manure being spread on the land is being washed off the land into the water and into Conesus Lake during precipitation events despite a 100 foot buffer strip. Loading data support this contention. The largest losses from the Long Point watershed occurred during events or directly after precipitation events (Figure 2, Table 4). Similarly, bacteria peaked after the large rainfall event of early April. Coliform bacteria (600 to 8240 per 100 mL), E. coli (0 to 240 per 100 mL) and heterotrophic bacteria (14,667 to 398,333 per 100 mL) increased dramatically. Besides manure being spread, there were no other likely large sources of bacteria, including geese, as none were observed during this period.

As has been shown in several different reports, nitrate concentrations in water draining the Long Point watershed are high during events and non-events. This result suggests that nitrate levels in the soil and in the ground water are high probably due to over fertilization of soils.
Literature Cited:


Makarewicz, J.C., and T.W. Lewis. 1999. Soil and nutrient loss from sub-watersheds in the Southwest quadrant of Conesus Lake. Technical report to the Livingston County Health Department and the Livingston County Planning Department, Mount Morris, NY.

Table 1. Water chemistry data from a tributary of Long Point Gully downstream from the Gray Farm on Route 32. TP = total phosphorus, TSS = total suspended solids, TKN = total Kjeldahl nitrogen, SRP = soluble reactive phosphorus and fecal coliform data is from Life Sciences Lab via Dick Davin.

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<th>TSS (mg/L)</th>
<th>TKN (µg N/L)</th>
<th>Sodium (mg/L)</th>
<th>SRP (µg P/L)</th>
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Table 2. Water chemistry data from the monitoring station on Long Point Gully at West Lake Road. TP = total phosphorus, TSS = total suspended solids, TKN = total Kjeldahl nitrogen and SRP = soluble reactive.

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<th>TKN (µg N/L)</th>
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Table 3. Water chemistry data from the monitoring station on Long Point Gully at West Lake Road prior to the application of liquid manure in the watershed. TP = total phosphorus, TSS = total suspended solids, TKN = total Kjeldahl nitrogen and SRP = soluble reactive.

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<th>TSS (mg/L)</th>
<th>TKN (µg N/L)</th>
<th>Sodium (mg/L)</th>
<th>SRP (µg P/L)</th>
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Table 4. Losses of nutrients and soil from the Long Point Gully watershed during and after liquid manure application. The lower portion of the table is data from prior to the manure application for comparative purposes. TP = total phosphorus, TSS = total suspended solids, TKN = total Kjeldahl nitrogen and SRP = soluble reactive.

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Prior to liquid manure application

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<th>Nitrate (kg/d)</th>
<th>TSS (kg/d)</th>
<th>TKN (kg/d)</th>
<th>Sodium (kg/d)</th>
<th>SRP (kg/d)</th>
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Table 5. Bacteria data from samples taken at the monitoring station on Long Point Gully at West Lake Road. Data is from Bob Simon, SUNY Geneseo.

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<th>NTU Avg</th>
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<th>Coliforms/100 ml Avg</th>
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<th>Heterotrophic bacterica (R2A Count ml) Avg</th>
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Table 6. Precipitation and daily discharge for Long Point Gully from 15 March to 15 April 2005. The precipitation data was collected by Jean Meekin, a National Weather Service spotter in the Graywood watershed of Conesus Lake. From 5 April to 15 April, the precipitation data is from SUNY Geneseo. NA = not available.

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Figure 1. Long Point watershed showing the fields where the manure spreading occurred. The watershed to the north is Sand Point Gully.
Figure 2. Losses of total phosphorus, total Kjeldahl nitrogen, total suspended solids (Soil) and discharge from Long Point Creek from 15 March to 13 April 2005. Arrows represent rainfall events.
Figure 3. Liquid manure spreader on the Gray Farm 14 March 2005
Figure 4. The top picture is the sampling site on Route 32 with the Gray Farm structures in the background. The bottom photograph shows the manure spread on the field, 15 March 2005.
Figure 5. The top photograph shows the liquid manure on the field in contrast to the field across Route 32 with no manure applied. Notice the difference in snow cover.
Figure 6. The top photograph shows the tractor entrance to the field where manure was being applied. The bottom photo is another angle of the same field.
Figure 7. Additional angles of the field where manure was applied. In the top picture the 100 foot buffer zone is evident along the tree line where the stream runs. The bottom photograph is taken from the Route 32 sampling location and shows the slope of the field in relation to the stream.
Subject: Manure spreading
From: RDavin@co.livingston.ny.us
Date: Fri, 15 Apr 2005 11:16:26 -0400
To: tlewis@brockport.edu

Ted. You asked for a little history on the spreading that took place on the Gray farm. Here is the way it unfolded. Received a call from a resident on 3/14/05 stating that manure was being spread on the Gray farm all weekend on frozen ground. I went out on that afternoon, Monday (3/14/05), and witnessed it and also spoke to the tractor driver. I asked why they were not injecting it as the spreader had injectors on it. The driver said the ground was too frozen. Monday was to be the last day of spreading as they were done. They had two tractor trailers delivering manure to the spreader. The tractor driver said he was aware of the farm management plan and he even had it in the cab of the tractor. He showed it to me and is staying 100 feet away from the streams. I didn't look at the plan in detail as I didn't think it was my place to do so or the right time. I called Pete Kanouse and he thought the practice wasn't right and gave me the phone # of Agriculture Consulting Service (ACS) they did the plan for Meyer's farm. I called ACS #877-310-1100 spoke with Erik. Erik said that winter spreading is OK on certain soils and the Meyer's farm have been doing an excellent job in complying with their directives. It depends on the nitrogen and phosphorus index of the soils and that determines where and when to spread.

Hope this helps out
Dick D.