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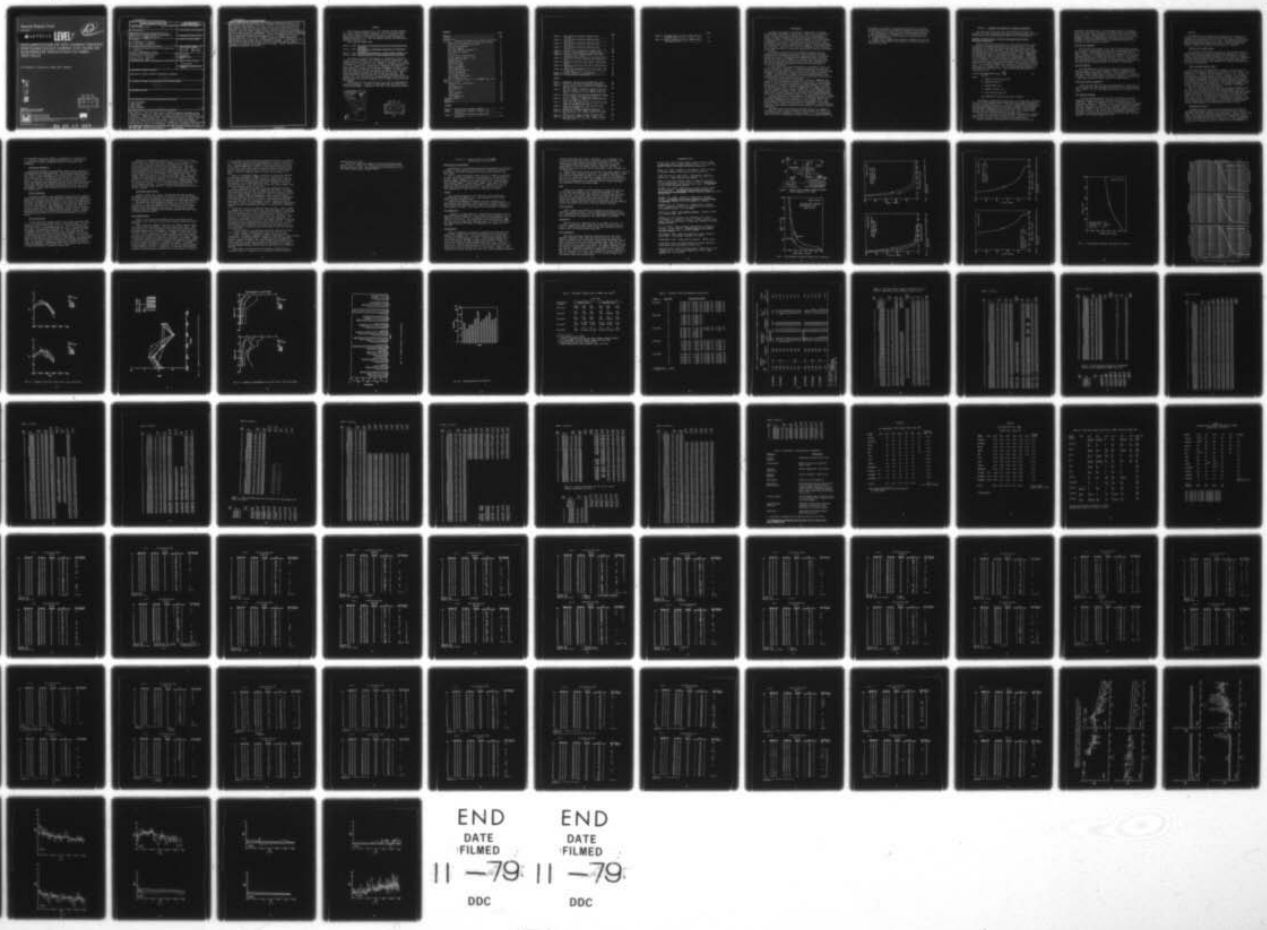

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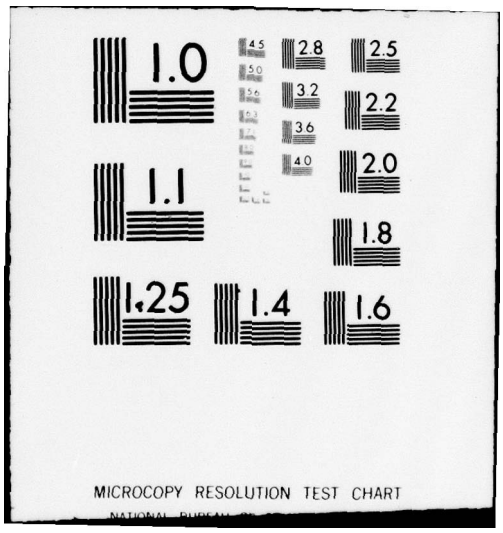
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DOCUMENTATION OF SOIL CHARACTERISTICS AND CLIMATOLOGY DURING FIVE YEARS OF WASTEWATER APPLICATION TO CRREL TEST CELLS

I.K. Iskandar, S.T. Quarry, R.E. Bates and J. Ingersoll

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The purpose of this data report was to document information gathered during the past five years on a field study on slow infiltration land treatment of wastewater. Emphasis was focused on presenting actual data as well as detailed descriptions of the methods used. Very little discussion is included. The report is divided into two main sections. Section I deals with physical properties of the two soils used and the changes in soil chemical characteristics during the five years of investigation. The physical properties of the soil are those most important in controlling the rate of water movement in soils.

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such as saturated and unsaturated soil hydraulic conductivity, particle size distribution, bulk density, void ratio, available water and specific gravity. The chemical characteristics of the soil that are of potential importance in assessing the short and long-term effects of wastewater application on land include: free iron oxides, organic carbon, organic nitrogen, pH, conductivity, cation exchange capacity, exchangeable cations, total and extractable phosphorus, and total and extractable heavy metals. Section II summarizes climatic conditions at the CRREL site in Hanover, New Hampshire, and the changes that occurred during the period 1974 to 1978. Climatic parameters include temperature, precipitation, wind speed, and soil temperature at depth. It is hoped that the data could be used by other workers for model validation; however, proper citation of the source of the data must be included. Further information may be obtained by writing to the authors.

PREFACE

This report was prepared by Dr. I.K. Iskandar, Research Chemist, S.T. Quarry, Physical Science Technician, R.E. Bates, Meteorologist, Snow and Ice Branch, Research Division; and by J. Ingersoll, Civil Engineering Technician, Geotechnical Research Branch, Experimental Engineering Division, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, N.H.

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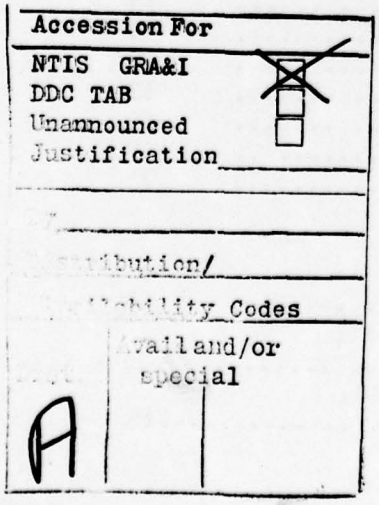

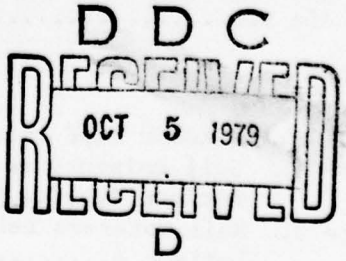

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INTRODUCTION

Treatment and disposal of wastewater by application on land has attracted many researchers in recent years. This is not a new concept because systems were designed and built as early as the sixteenth century in Europe (Iskandar 1978) and probably much earlier than that in China and Greece. The present interest, however, is in the treatment of wastewater on a cost effective basis and in the protection of our environment from pollution. Mathematical models may be used to optimize the utilization of a land treatment system. However, the available models lack validation. There is also a lack of information in the literature on the long-term effects of wastewater application on land for the purpose of treatment.

The purpose of this report is to summarize available data on a rather long-term experiment conducted to obtain data both for model validation and for addressing potential long-term effects of wastewater application on land. Although several mathematical models are being checked with these data at CRREL at the present time, the authors feel that the data obtained during the past five years are invaluable and that other researchers and modelers should have the opportunity to utilize this information.

In this report, the analytical methods are described in detail and little discussion is presented. It should be mentioned that reported data for the initial phases of the study (1973 and 1974) are from analyses performed at a commercial laboratory, while later analyses were done at CRREL. Despite efforts to employ the same analytical methods, some inconsistencies in the concentrations of P or trace metals could be due to the differences between the two laboratories.

This report is written in two sections: Section I summarizes the changes in soil characteristics during the study period. For more information on the plant yield and analysis of applied and percolated effluent during the study period, the reader should consult Jenkins et al (1978), and Iskandar et al (1976). Section II summarizes the climatic data near the land treatment test facilities at CRREL and is a continuation of the report by Bilello and Bates (1978). The previous report included meteorological data recorded during the period October 1972 through March 1974. Section II presents meteorological data for the period April 1974-May 1978.

Climatic restraints on the renovation of wastewater have been a problem for many geographical areas, especially in cold and humid regions and in areas where unsuitable soil conditions for land treatment exist. The meteorological variables which were measured continuously at the CRREL climatic station include; precipitation, air temperature, relative humidity, snow depth, wind speed and direction, solar radiation, evaporation and soil temperature.

The CRREL Outdoor Land Treatment Research Facility was designed to investigate the slow infiltration mode of land treatment and consists of the following major components as shown in Figure 1: a) six large-scale outdoor test cells containing two different soil types, Windsor sandy loam

and Charlton silt loam; b) conventional pre-application treatment processes to produce both primary and secondary treated effluents; c) the capability for routine on-line disinfection with ozone prior to land application; d) the capacitlity to add desired materials to the raw wastewater to simulate industrial contributions; and e) a climatology station.

Tables 1 and 2 summarize the wastewater loading rates for the test cells and the periods of application, respectively, during the period 1973 to 1978.

SECTION I. SELECTED SOIL PHYSICAL and CHEMICAL PROPERTIES

The soils used in the test cells were Windsor sandy loam, and Charlton silt loam, representing two textural classes; however, both are classified as Entic Haplorthode according to the 7th approximation.

Hydraulic characteristics of Windsor and Charlton Soils Before Wastewater Applications.

Several hydraulic characteristics of soils must be known in order to determine the maximum application rate of liquid waste. Of these parameters, the saturated and unsaturated hydraulic conductivity and diffusivity are the most important. The first parameter, also known as the permeability of the soil, determines the rate at which water passes through the soil when it is saturated with water. Table 3 summarizes the permeability data for both Windsor and Charlton soils. These data were obtained by using a Lucite cylinder of approximately 10-cm length and 5-cm diameter. A constant head was used and at least two densities of each soil and two runs at each density were tested. Data in Table 3 demonstrate the higher permeability of Windsor soil compared to Charlton soil. It is therefore expected that wastewater could be applied to the Windsor soil at a higher rate. Also, the residence time of water is much shorter in the Windsor soil. The constant head permeability was calculated from (1)

$$\text{Constant head permeability at } 20°C \quad K_{20} = \frac{QLR_T}{hAt} \qquad (1)$$

Where

Q = quantity of water flow, cm^3

h = hydraulic head, cm

t = elapsed time, sec

L = length of travel, cm

A = Cross section area, cm^2

R_T = temperature correction for water viscosity

The hydraulic conductivity unsaturated, on the other hand, determines the rate of water movement when the soil pores are partially saturated with water and partially with air. This is a rather difficult measurement. Several investigators (Green and Corey 1971) estimated the unsaturated soil hydraulic conductivity from a moisture retention - water content function and the permeability data of the soil. The estimated values compared well with the measured values for many soils.

The moisture retention curve was obtained by plotting the volumetric water content as a function of tension (cm H_2O). Figures 2 to 7 show the moisture retention curves for Windsor and Charlton soils.

Moisture retention characteristics for the Charlton soils were

determined using Tempe cells. This procedure provides a desorption curve only. The curves relating to the Windsor soils were determined using a volumetric plate extractor to obtain both the adsorption and desorption curves. Assuming that the tension is zero at the saturated hydraulic conductivity (permeability) and using a model developed initially by Green and Corey (1971), the unsaturated hydraulic conductivity of the soil can be estimated.

Particle size analysis

The particle size analyses of the soils were performed by sieving for the coarse particles and by sieving with a hydrometer method for the fine particles. All analyses were done by the Soils Laboratory at CRREL. Figures 8 and 9 illustrate the results obtained for the Windsor and Charlton soils. In Windsor soil the clay content is <1%, the silt (50-2 μm) ranges from 8 to 12%, and the sand (> 50 μm) is about 90%. The Charlton soil has a clay content <5% throughout the profile with the silt and sand percentages being 35 $\pm$ 5% and 60 $\pm$ 5% respectively.

Soil Bulk Density

The bulk density was calculated by dividing the oven-dry soil weight in grams by the volume occupied. Table 31 contains data on soil bulk density expressed in grams/cm^3. The bulk density of the different horizons ranged from 1.1 (horizon A Charlton) to 1.8 (horizon C Windsor). The low bulk density of horizon A Charlton is probably due to the higher content of organic matter of low bulk density.

Other Soil Physical Parameters:

There are many other soil physical parameters that could affect to variable degrees the water movement characteristics of a land treatment site. However, only the most important factors will be defined in this report.

Soil Chemical Analysis

Soil core samples were taken in April of each year since 1973 (before wastewater application). Each core was divided into 15-cm increments. Samples were composited after collection and were air-dried before analysis or shipping to the U.S. Testing Laboratory, Memphis, Tennessee, for analysis. Analyses of the samples collected in 1973 and 1974 were conducted at the U.S. Testing Laboratory, while the others were done at CRREL. After drying, the soils were passed through a 2-mm stainless steel sieve, and the less than 2-mm-diameter fraction was determined. This fraction was stored in plastic-lined paper bags until analyzed. The following methods were used.

Soil pH

The method used to determine pH was similar to that reported in Methods for Soil Analysis (Black 1965, section 60-3.4). Twenty ml of distilled water were added to 20 g of soil. The suspension obtained was mixed with a mechanical stirrer for 1 hour. The pH was read directly using a standard glass/calomel electrode pair while the mixture was agitated. Results were reported to the nearest 0.1 pH unit.

Soluble salts (conductivity)

The solution from the sample prepared for the pH determination was subsequently filtered through a Buchner funnel (Whatman no. 1 filter paper). The overall procedure was similar to that reported in Methods for Soil Analysis (Black 1965, sections 62-1.3.2.2 and 62-2). Electrical conductivity was determined using a standard Wheatstone bridge with a dip-type conductivity cell (cell constant=1.0). Results were reported to the nearest 0.01 mmhos/cm.

Cation exchange capacity (CEC)

The method used to determine CEC is similar to that reported in Methods for Soil Analysis (Black 1965, sections 57-2.1 and 57-2.3). One hundred ml of 1 N NH_4OAc, pH 7 were added to 20 g of soil. The mixture was shaken for 1 hour and allowed to settle overnight. It was then filtered through a Buchner funnel fitted to a suction flask. The sample was leached incrementally with additional NH_4OAc solution to obtain a total volume of 200-225 ml of filtrate. The filtrate was transferred to a 250-ml volumetric flask and made up to that volume with NH_4OAc. This solution was set aside for determination of individual exchangeable cations, as described in the next section.

The soil in the Buchner funnel was then leached incrementally with 200-250 ml of isopropyl alcohol to remove excess NH_4OAc. Distilled water was used to transfer the soil to a Kjeldahl flask (800 ml); boiling stones, 450-500 ml of distilled water, and 25 ml of 1 N NaOH were then added to the flask. The sample was then distilled into 50 ml of 4% boric acid. A total of about 200 ml of distillate was collected. The final distillate was titrated with 0.1 N HCl using an indicator solution. The milliequivalents of NH_3 collected are equivalent to the exchange capacity when expressed in milliequivalents per 100 g of soil.

Exchangeable cations

The NH_4O AC extract from the CEC determination was analyzed for individual exchangeable cations (Na^+, K^+, Ca^{2+}, Mg^{2+}) with a Perkin-Elmer Model 403 atomic absorption spectrophotometer using an air/acetylene flame. Instrument settings were established using procedures recommended by the manufacturer (Perkin Elmer 1971). Results were expressed as parts per million of cations on a weight basis. This procedure for extraction of exchangeable cations is similar to that recommended by

Jackson (1958, section 5-11).

Organic carbon

Organic carbon was determined by a Walkely-Black method similar to that outlined in Methods for Soil Analysis (Black 1965, section 90-3). Either 1.0 g or 0.5 g of soil, depending on the level of organic matter, was mixed with 10 ml of 1 N $K_2Cr_2O_7$ in a 250-ml Erlenmyer flask. Twenty ml of concentrated H_2SO_4 were added to the flask, the mixture was swirled for 1 min, and then allowed to cool for about 30 min. Water (150 ml) and several drops of o-phenanthrolene indicator were added, and the resulting mixture was allowed to recool. The suspension was titrated with 0.5 N $Fe(NH_4)_2(SO_4)_2$. The chromate was standardized by repeating the procedure without soil. The percentage of organic carbon was calculated using the following equation (Black 1965):

$$\% \text{ Organic C} = \frac{\text{meq}K_2Cr_2O_7 - \text{meq Fe } (NH_4)_2(SO_4)_2}{\text{g dry soil}} \times 0.3.$$

No correction factor (normally x 1.33) was applied in making the calculation.

Organic-Nitrogen

Organic nitrogen was determined using a Kjeldahl method similar to that outlined in Methods for Soil Analysis (Black 1965, section 83-3). It was assumed that the exchangeable ammonium contribution was insignificant so that the result represented organic nitrogen. Ten g of soil was mixed with 20 ml of water in an 800-ml Kjeldahl flask, and then 0.1 g HgO(red) and 30 ml of concentrated H_2SO_4 were added. The mixture was digested, according to the standard procedure, for 5 hours. The sample was cooled, 500 ml distilled water was added, and the sample was then recooled. To the same flask, 25 ml of 16% $Na_2S_2O_4$ solution and several granules of mossy zinc were added and 50 ml of distillate was collected in 50 ml of 4% boric acid. The distillate was titrated with 0.1 N HCl using the standard indicator solution. The results were expressed in terms of percentage of organic-N on a dry weight basis.

Free iron oxides

The procedure followed was that given in Methods of Soil Analysis (Black 1965, section 65-4). Five g of air-dried soil, 5 g of $Na_2S_2O_4$ and 100 ml of water were placed in a flask, which was then immediately shaken for 16 hours. The suspension was transferred to a 250-ml beaker, the pH was adjusted to 3.5 to 4.0 with 1 N HCl, and the suspension was stirred several times over one hour period. The suspension was transferred to a 250-ml volumetric flask, diluted to that volume with water, and mixed. Five ml of clear filtered extract was transferred to a 250-ml

beaker using a mechanical source of suction to fill a 50-ml pipette. The solution was diluted to about 100 ml, 15 ml of H_2O_2 was added, and the contents were boiled again for 5 to 10 min.

A small excess of 7 N NH_4OH was added and the solution was boiled 15 to 20 min. The $Fe(OH)_3$ precipitate was dissolved by adding 15 ml of 6 N HCl through the lip of the covered beaker. The solution was heated to 90°C, and the Fe reduced by adding $SnCl_2$ reagent dropwise and stirring the solution until the yellow color disappeared. An excess of 4 drops of $SnCl_2$ was added, the solution was cooled to room temperature, and 15 ml of saturated $HgCl_2$ was added rapidly from a volumetric cylinder.

The solution was diluted to about 125 ml, and then 5 ml of 85% H_3PO_4 and 10 drops of 0.16% barium diphenylamine sulfonate were added. The solution was titrated with standardized 0.1 N $K_2Cr_2O_7$ to a violet-blue endpoint. The free Fe oxides as percentage of Fe_2O_3 in the soil were calculated as follows:

Free Fe oxides = (ml of $K_2Cr_2O_7$)(Normality of $K_2Cr_2O_7$)(7.92).

Organic phosphorus

The method used for determination of organic phosphorus was adapted from those recommended in Methods of Analysis (Black 1965, section 73-3) and Sanders (1955). Two g of soil were ignited in a silica crucible for one hour at 550°C. The ignited sample and a duplicate 2 g unignited sample was then extracted by shaking for 2 hours with 100 ml of 0.2 N H_2SO_4 in a shaker. Inorganic phosphorus in the extracts was determined using a standard molybdate method (Orr 1971). An aliquot of a sample 3-10 ml in volume, depending on concentration, was mixed with 2 ml of ammonium molybdate-HCl reagent and 2 ml of Elon reagent. The solution was diluted to a 25-ml volume and allowed 15 min for color development. Color intensities of the samples, blanks, and standards carried through the extraction procedure were determined using a colorimeter. The increased phosphorus resulting from ignition was taken to represent organic phosphorus. Results were expressed as parts per million on a weight basis.

Total phosphorus

Total phosphorus was determined using two methods. The first method was an acid-digestion technique. Later, in determining organic phosphorus, it was found that total phosphorus obtained by ignition was different (frequently higher) than that obtained by digestion. Consequently, both values were reported when available.

The digestion method employed was that in Methods of Soil Analysis (Black 1965, section 73-2). Two g of soil were treated with 30 ml of 60% $HClO_4$ in a 250-ml volumetric flask. The mixture, after digestion on a hot plate until white $HClO_4$ fumes appeared (3-4 hours), was cooled and made up to a 250-ml volume with distilled water. The solution was then filtered before analysis for total phosphorus using the molybdate method (Orr 1971) employed above for analysis of organic phosphorus. Results

were expressed as parts per million of phosphorus on a weight basis.

The value obtained for ignited samples during the procedure for determination of organic phosphorus was taken to represent total phosphorus.

Extractable phosphorus

Extractable phosphorus was determined using the Bray technique for estimating plant available phosphorus. The extraction procedure used was similar to that in Methods of Soil Analysis (Black 1965, section 73-4.1). One g of soil was shaken for 5 min with 10 ml of 0.03 N NH_4F - 0.025 N HCl solution. The suspension was filtered to obtain the clear extract. Two ml of the extract was added to 4 ml of extracting solution. The phosphorus was determined colorimetrically using the procedure (Black 1965) described for organic phosphorus, except that 0.5 ml each of molybdate and Elon reagents were added directly to the 6 ml of prepared sample. Results were expressed as parts per million phosphorus on a weight basis.

Soluble phosphorus

A procedure similar to that described in Methods for Soil Analysis (Black 1965, section 73-4.3) was employed to extract soluble phosphorus. Twenty ml of distilled water was added to 10 g of soil in a sample bottle. The mixture was shaken for 24 hours and a clear extract was obtained by filtering. Molybdate and Elon reagents (0.5 ml each) were added directly to 6 ml of soil solution. The colorimetric procedure (Orr 1971) was similar to that used for organic phosphorus. Results were expressed as parts per million on a dry weight basis with respect to soil. Soluble phosphorus with respect to solution concentration is equal to one-half the reported value, since 10 g of soil was equilibrated with 20 g of water.

Total heavy metals

For the analysis of cadmium, copper, zinc, nickel, chromium, lead, two g of soil were digested with 20 ml of concentrated HNO_3 in a 100-ml volumetric flask on a hot plate for 30 min. The mixture was cooled, after which 10 ml of concentrated $HClO_4$ and 5 ml of concentrated H_2SO_4 were added. The sample was redigested for 5 hours or until the volume of remaining acid was reduced to about 5 ml. The volume was then increased to 100 ml with distilled water and the sample filtered. The concentrations of heavy metals were determined directly on the extract using a Perkin-Elmer 403 atomic adsorption spectrometer. An air/acetylene flame was used when the concentration of a given element was sufficiently high. For low concentrations, a Perkin-Elmer (1973) HGA 2100 graphite furnace was employed. Instrument settings were established using procedures recommended by Perkin Elmer (1971, 1973). Results were reported on a parts per million or billion by weight basis.

Mercury was determined by digesting 1 g of soil with 5 ml of concentrated HNO_3 in a 300-ml BOD bottle, heating on a hot plate for 30 min at 60°C after the initial oxidation of organic matter occurred. A second state of digestion was achieved by adding 15 ml of aqua regia with further heating for 60 min at the same temperature. The above digestion procedure has been reported in detail by Hamm (1973). Mercury in the digestate was determined with a Coleman Mercury Analyzer MAS-50 using the manufacturer's (Perkin Elmer 1972) suggested procedure. The digested sample was diluted to 100 ml with distilled water. Five ml of 5% $KMno_4$ were then added and the solution was mixed. Other oxidizing reagents were added next in sequence: 5 ml of 5.6 N HNO_3 (swirl and wait 15 s); 5 ml 18 N H_2SO_4 (swirl and wait 45 s). Reducing agents were then added in the order: 5 ml of 1.5% hydroxylamine hydrochloride; 5 ml of 10% stannous chloride. At this point the solution was ready for analysis using the Coleman Analyzer. Results were reported in parts per billion by weight.

Extractable heavy metals

Cadmium, copper, zinc, nickel, chromium and lead were extracted by shaking 10 g of soil with 50 ml of 0.1 N HCl for 1 hour and filtered. The concentrations of extractable heavy metals in solution were determined by atomic absorption spectroscopy as described for total heavy metals.

Extractable Hg was determined by shaking 5 g of soil with 50 ml of 0.1 N HCl for 1 hour. The suspension was filtered, and the soil was leached with an additional amount of 0.1 N HCl until a total filtrate volume of 100 ml was obtained. The mercury in the extract was then determined using the Coleman Mercury Analyzer procedure described above in determining total mercury.

Soil Chemistry Data

Tables 4 to 8 contain all available data on the chemical characteristics of the soil from the test cells collected during the period 1973-1978.

Table 4 shows the changes in the free iron oxides, organic carbon, organic-N, pH and conductivity of the soils from the test cells. There is a tendency for a slight decrease of free iron oxides content with wastewater application. Both organic-C and organic-N content increased from 1973 to 1976. Figure 10 shows the organic-C in Test Cells 1 and 6. This is due to application of suspended solids, BOD in the applied wastewater and residue of forage grass. Application of primary effluent is expected to increase both organic-N and organic-C even higher. Figure 11 shows that organic-N is highly correlated with organic-C ($r= 0.9363$). Using this linear regression, it is possible to predict one parameter if the other parameter (organic-C or organic-N) is known. In practice, usually organic-C is easier to analyze for and the precision of analysis is usually higher than that for organic-N. In addition, determination of organic-N requires special apparatus while the analysis for organic-C

may be performed by normal laboratory apparatus (titration, or ignition).

The data in Table 4 show a consistent drop in soil pH from 1974 to 1976. This was explained by Iskandar (1978) as a result of nitrification of applied ammonium-N. Figure 12 illustrates the drop in soil pH of Test Cells 1 and 6 and Figure 13 shows the change in soil pH in the top (0-15 cm) layer from all the test cells. The rise in soil pH after 1976 is a result of applying lime to the test cells (Jenkins et al. 1978).

There is a negligible change in conductivity values with time due to wastewater application to CRREL test cells. This could be due to several reasons including low salt content of applied water, high rainfall and snow fall with more water percolating through the soil than that applied, or low evapotranspiration (ET). Therefore it could be concluded that there is no fear of salt build-up in land treatment soils in the northeastern region of the U.S.A.

Table 5 summarizes the changes in CEC and exchangeable cations during the period 1973 to 1978. As normal for most soils, the surface soils exhibited higher CEC than the underlying layers due to the higher content of organic matter in the surface. There is no apparent trend in long-term changes of CEC and exchangable cations; however, several conclusions could be drawn from the data. The increase in exchangeable Ca in 1976 data (Fig. 14) is a result of liming discussed previously. Exchangeable Na was <5% of exchangeable cations, indicating that the soils are not likely to become alkaline soils. Exchangeable ammonium was determined in 1977 and 1978 and was found to be very low (<0.2 meg/100 g soil).

Phosphorus is one of the important plant nutrients. Table 6 shows the changes in P concentrations in soils receiving wastewater during the period from 1973 to 1976. Total P determined by ignition is much higher than that determined by the acid extraction method. Because it is easier in some laboratories to determine total acid extractable P than ignition-P, a correlation between the two forms was calculated. The correlation coefficient (r) is 0.96 for the samples analyzed in 1973 and 1974 and is 0.99 for those analyzed in 1975, 1976, and 1977. It should be emphasized that a different acid extraction procedure was used in 1975, 1976 and 1977, which may be the reason for the higher values of acid extractable P obtained in those years compared with those obtained in 1973 and 1974.

In land treatment, P is applied in much higher amounts than plant need. Table 6 shows a phosphorus mass balance for test cells 1-6.

In land treatment, P is applied in amounts well above plant requirements. In general, phosphorus uptake by forage grass in land treatment accounts for only 20-30 kg P/ha/yr. Depending on the rate and composition of applied wastewater, more than 100 kg/ha/yr of phosphorus is usually applied. In contrast, we should be more concerned with the fate of unutilized phosphorus. Unpublished data (Iskandar et al.) showed that both Windsor and Charlton soil have a high capacity for phosphorus sorption.

Extractable P (plant available-P) increased by application of wastewater (Table 6). However, no P leaching was observed during the

reported period of study.

Tables 7 and 8 show the changes in total and extractable heavy metals in soils. There is an increase in the concentration of all metals in all test cells. For interpretation of the data up to 1975, the reader should consult Iskandar (1975).

Section II. Climatic Survey at the USACRREL Land Treatment Site 1974-1978.

Meteorological Measurements

Explanations of the measured meteorological parameters are presented in Table 9. Meteorological instrumentation, methods and procedures for recording the data were discussed in a previous report (Bilello and Bates 1978).

The U.S. Army Meteorological Team stationed at CRREL is responsible for data collection, calibration of instrumentation, and publication of monthly climatic summaries for the land treatment site. This monthly climatic summary includes hourly measurements, daily tabulation sheets and a monthly summary. Meteorological summary sheets (April 1974-May 1978) for CRREL are presented in Appendix A. Appendix B is the soil temperature during the period Sept. 76 - April 78 for Test Cell 5. Soil temperature for other test cells is available on request.

Climate

The long-term averages for air temperature and precipitation (including snow) for Hanover, N.H., were presented in the previous report (Bilello and Bates 1978).

Tables 10-14 summarize the monthly and yearly averages of the meteorological data obtained. Daily temperature, relative humidity, dew point and wind speed and direction, along with the monthly average of each parameter for April, 1974 to May 1978, are presented in Appendix A.

Air Temperature

A summary of average monthly air temperatures from October 1972 to May 1978 is given in Table 10. The 5-6 year average temperature for the CRREL site is 6.4°C (43.6°F), as compared with the long-term 30- year norm of 7.1°C (44.7°F). The coldest year of the study period at CRREL was 1976, when the temperature averaged nearly 1.1°C (2°F) below normal. The warmest year was 1973, when the temperature was normal, or 7.1°C (44.7°F).

Precipitation

Table 11 summarizes total monthly precipitation from October 1972 to May 1978. Figure 15 is a plot of the monthly total precipitation from April 1974-April 1978. The monthly precipitation amounts (Fig. 15) are not uniform from year to year. Average total precipitation for the 5-6 year period (monthly) is shown on the bar-graph (Figure 16). Total precipitation for CRREL averages 960 mm (37.80 in.), which is 51 mm (2.01 in.) greater than the 30-year (1941-1970) normal of 909 mm (35.78 in.). The total precipitation in 1974 was 123 m (4.86 in.) below normal and in 1976 was 103 mm (4.06 in.) above normal. Figure 16 also illustrates that over the past five years, the peak precipitation generally

occurred during June and October. Therefore, it is recommended that the wastewater application be decreased during those two months. The normal 30-yr monthly precipitation totals for Hanover, N.H. (from "Climatological Data Monthly New England", NOAA) show averages of approximately 76 mm (3 in.)/month; however, Figure 15 and Table 11 demonstrate that precipitation varies considerably on both a monthly and an annual basis.

Tabular record every 4 hours was printed by the CRREL computer staff for each channel daily throughout each month. For example, Appendix B gives the daily soil temperature recorded in °C each month for the center of test cell #1. Records are available in CRREL files on soil temperature data for the other 5 test cells. The uniqueness of this type of plot is that the soil temperature at a known depth can be followed throughout the freeze-thaw, winter and spring seasons.

Wind

Table 12 is a summary of average monthly wind speed and direction for the CRREL meteorological site. Wind speeds averaged 1.7 m/sec (3.7 mph) and wind directions were variable, prevailing from the northwest and south. The earlier report (Bilello and Bates 1978) gives an indication of prevailing wind directions, and the latter 4 years of record show little difference from the previous study. The data also confirm the findings "that winter winds are prevailing from the northerly quadrant and summer winds prevail from the southerly quadrant."

Solar radiation

Table 13 shows solar radiation in langleys (g-cal/cm^2) per day reported as monthly averages. Yearly averages are also shown for 1974-1977. Maximum amounts occurred in July (approximately 500 langleys/day) and minimum amounts (approximately 100 langleys/day) in December.

Evaporation

Table 14 shows the evaporation data at the CRREL test cells. At this site evaporation is only significant during the period of May to October. Maximum evaporation occurs in May, June, and July, with the highest total of 164 mm recorded in May 1975.

Soil temperature

Soil temperature data presented in Appendix B cover the period September 1976-April 1978. These data were recorded by a Kaye Data Logger programmed to record and store on paper tape thermocouple outputs every 4 hours at 0-24-in. soil depths throughout the 6 test cells. A tabular record every 4 hours was printed by the CRREL computer staff for each channel daily throughout each month. For example, Appendix B gives the daily soil temperature recorded in °C each month for the center of test cell #1. Records are available in CRREL files on soil temperature data for the other 5 test cells. The uniqueness of this type of plot is that soil temperature at a known depth can be followed throughout the freeze-thaw, winter and spring seasons.

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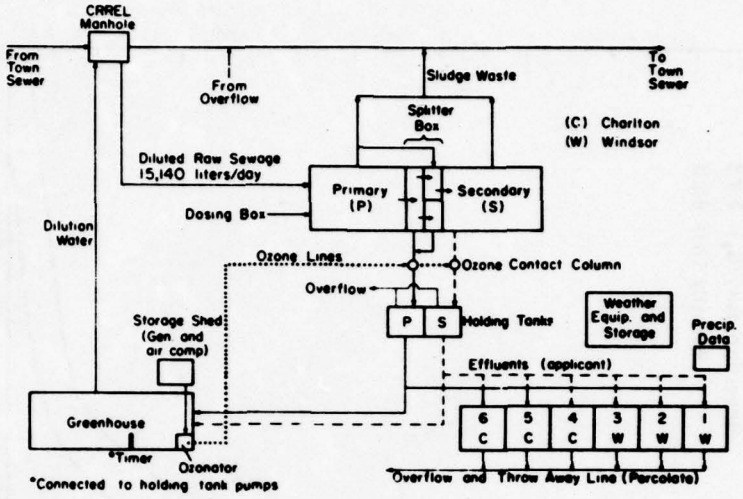


Figure 1. Outdoor land treatment research facility (after Iskandar et al. 1976).

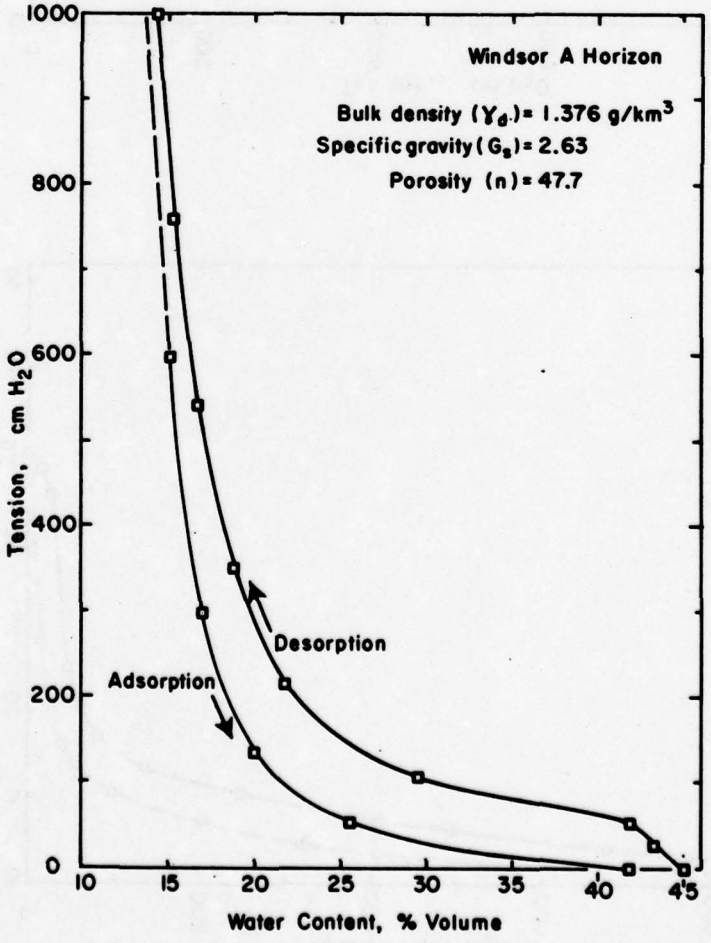


Fig. 2. Soil moisture retention, Windsor soil, horizon A.

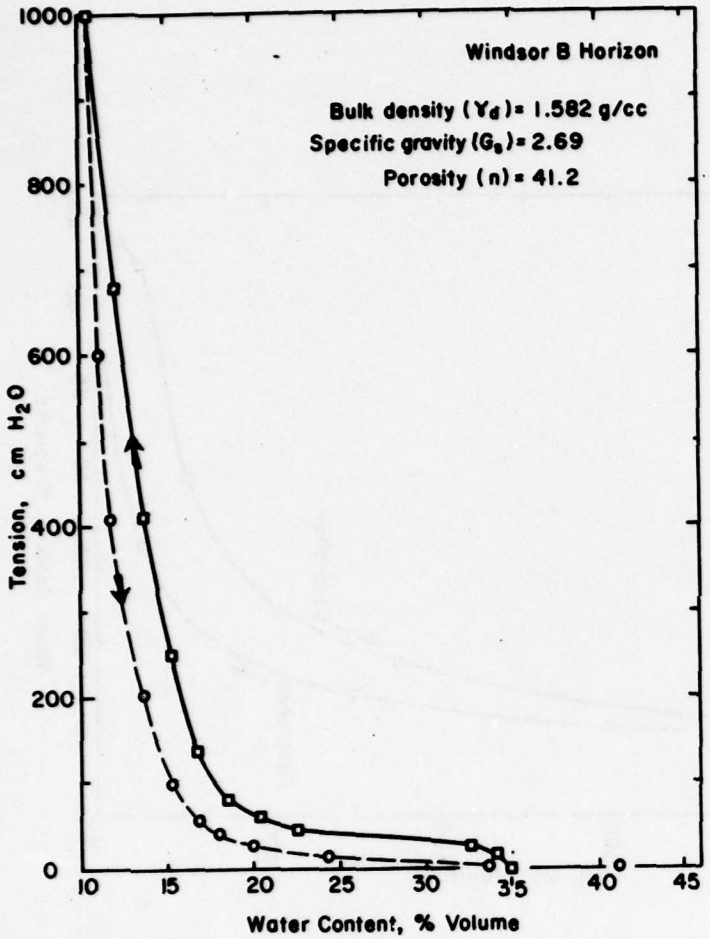


Fig. 3. Soil moisture retention, Windsor soil, horizon B.

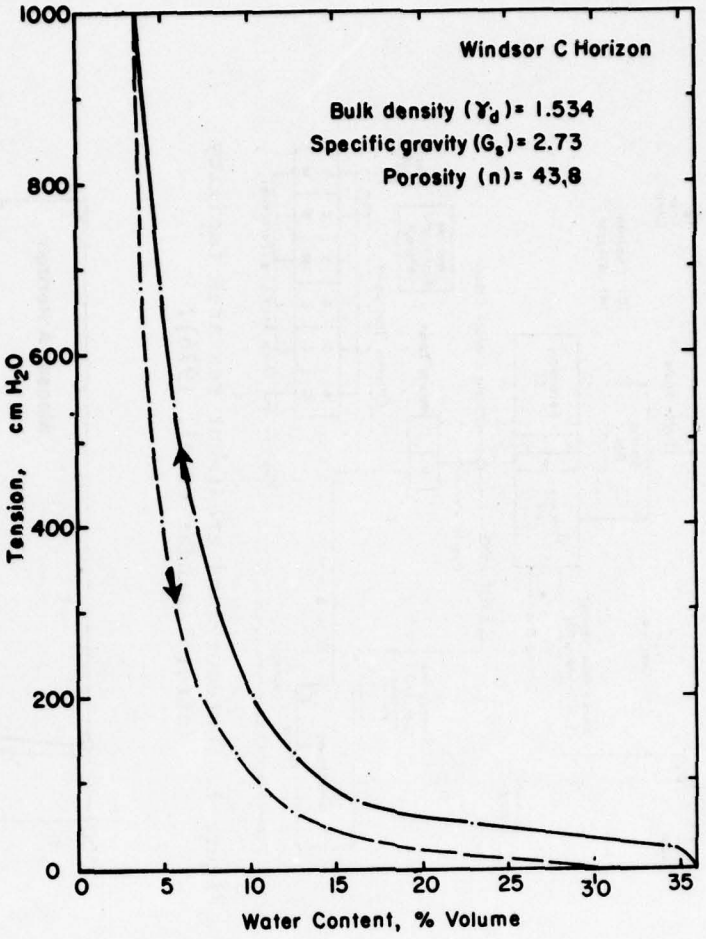


Fig. 4. Soil moisture retention, Windsor soil, horizon C.

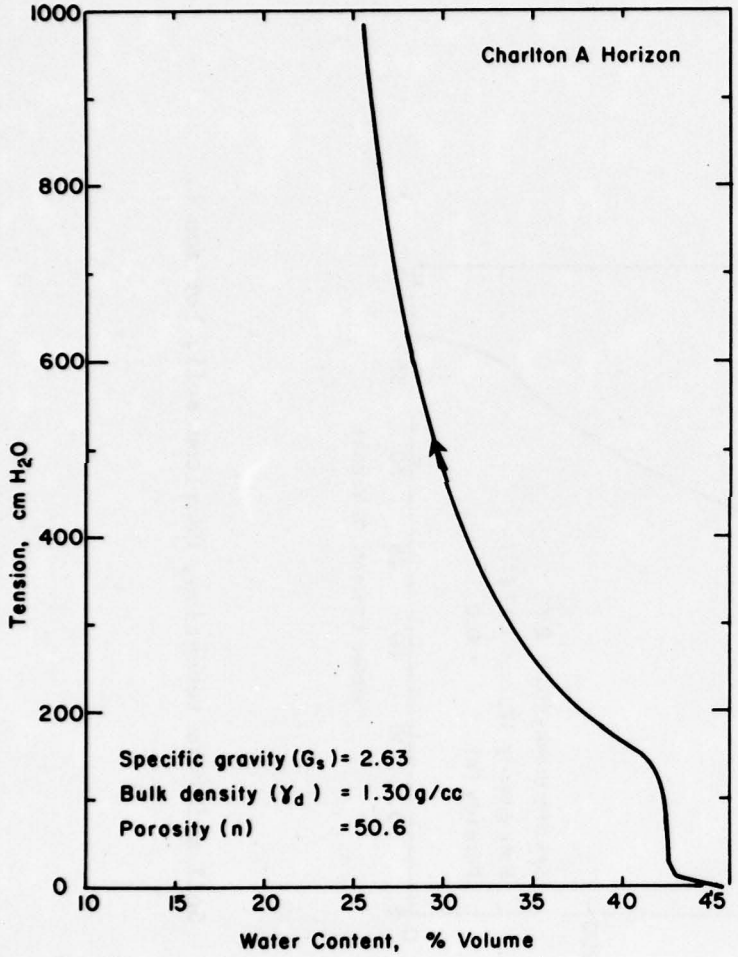


Fig. 5. Soil moisture retention, Charlton soil, horizon A.

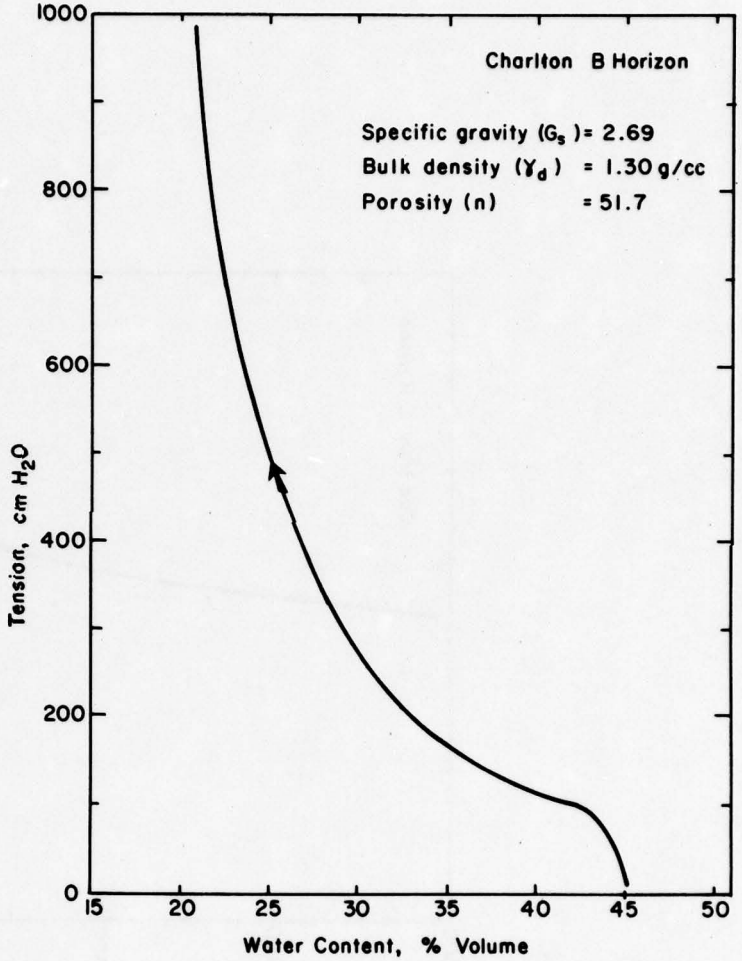


Fig. 6. Soil moisture retention, Charlton soil, horizon B.

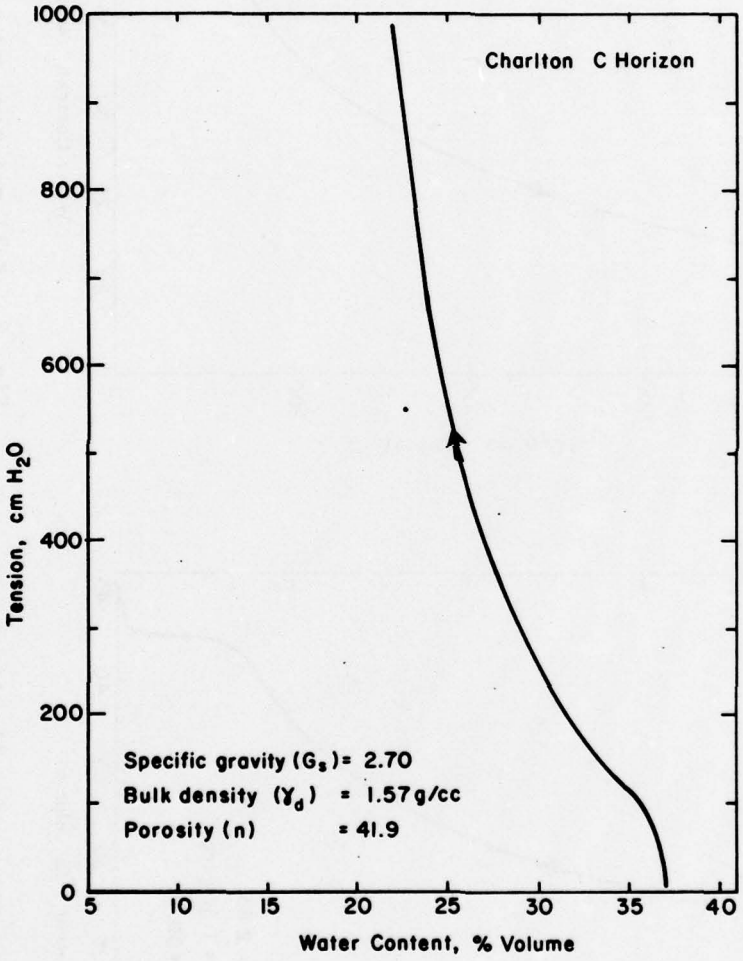


Fig. 7. Soil moisture retention, Charlton soil, horizon C.

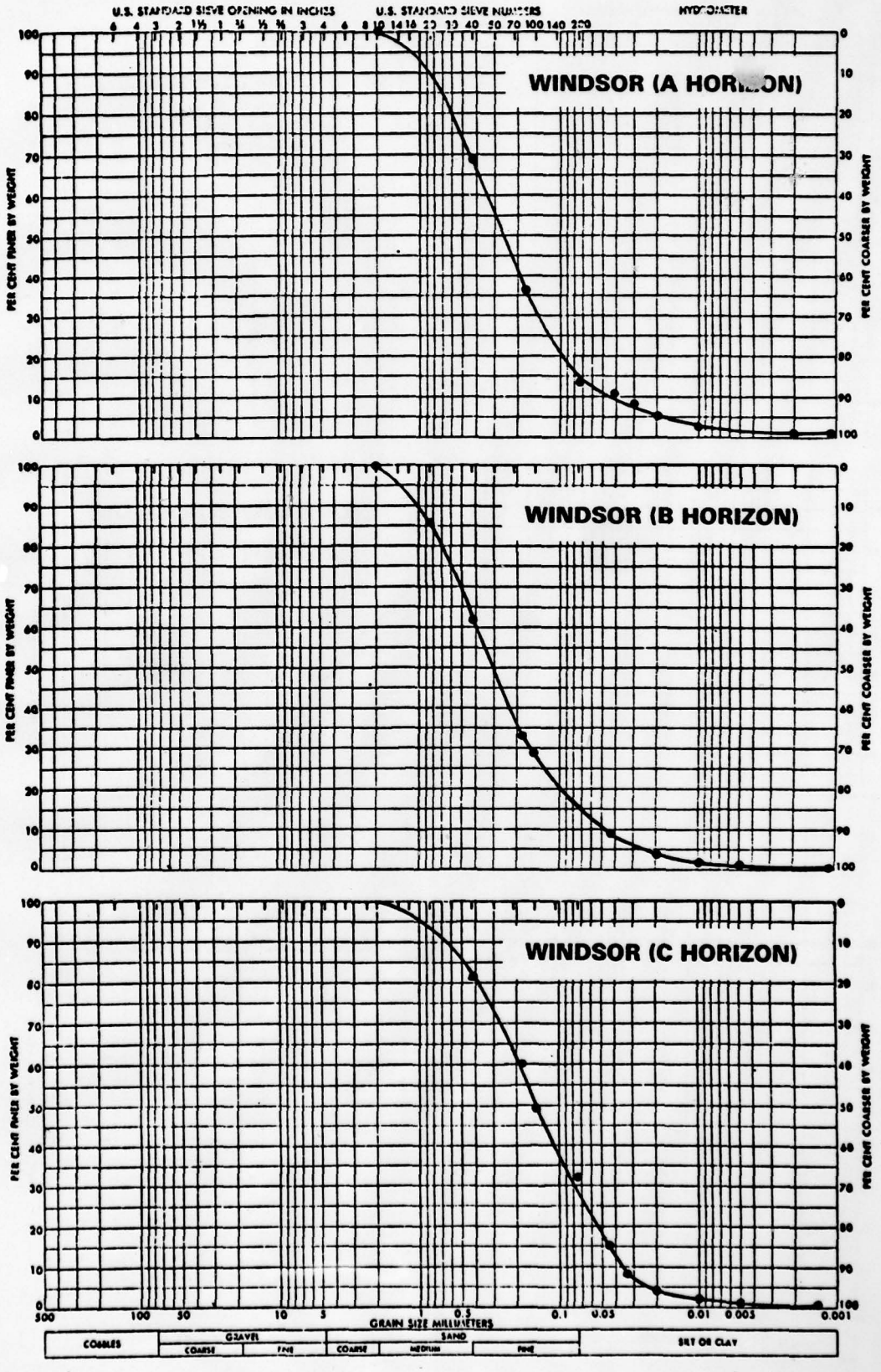


Fig. 8. Particle size distribution, Windsor soil.

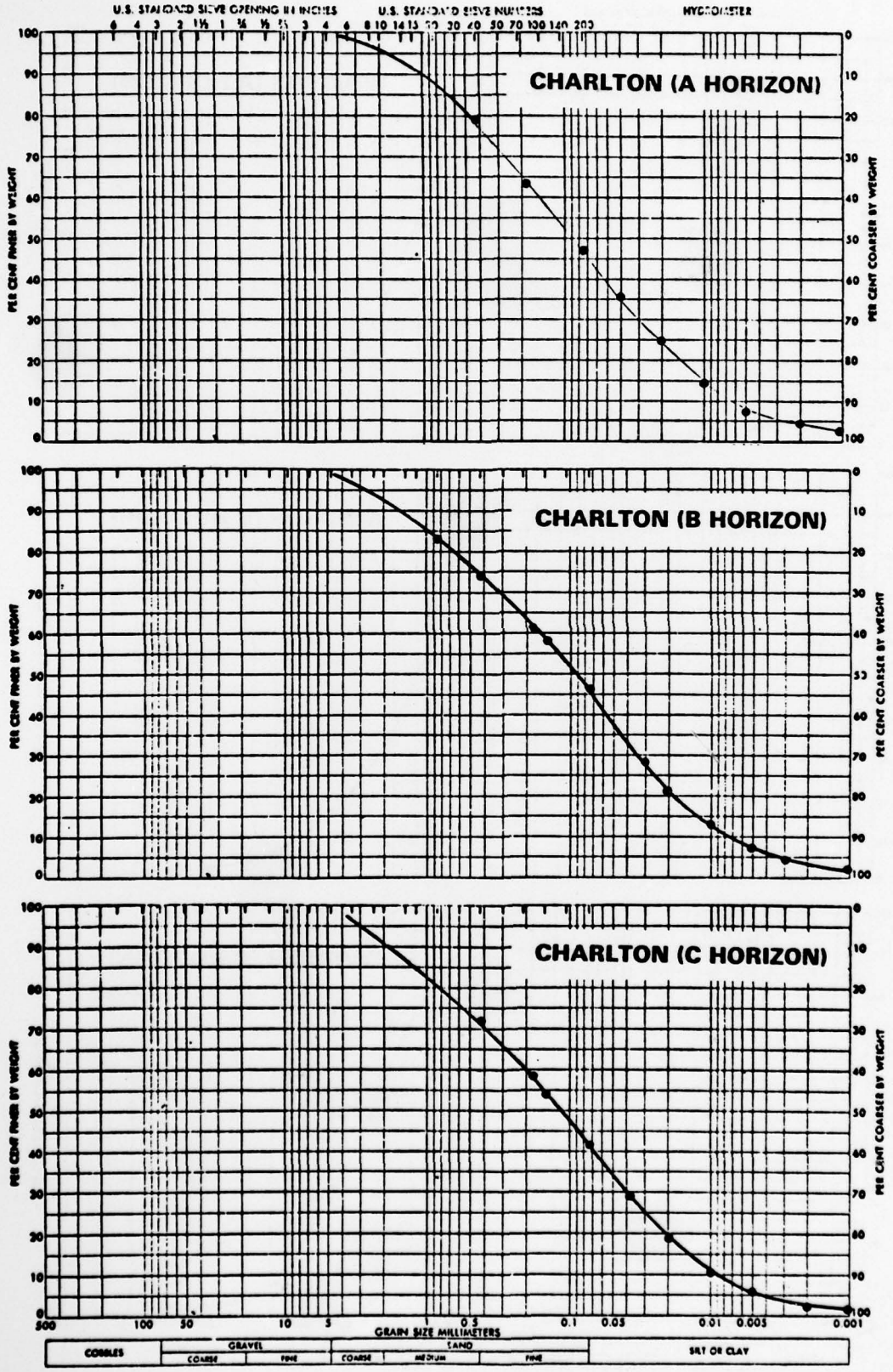


Fig. 9. Particle size distribution, Charlton soil.

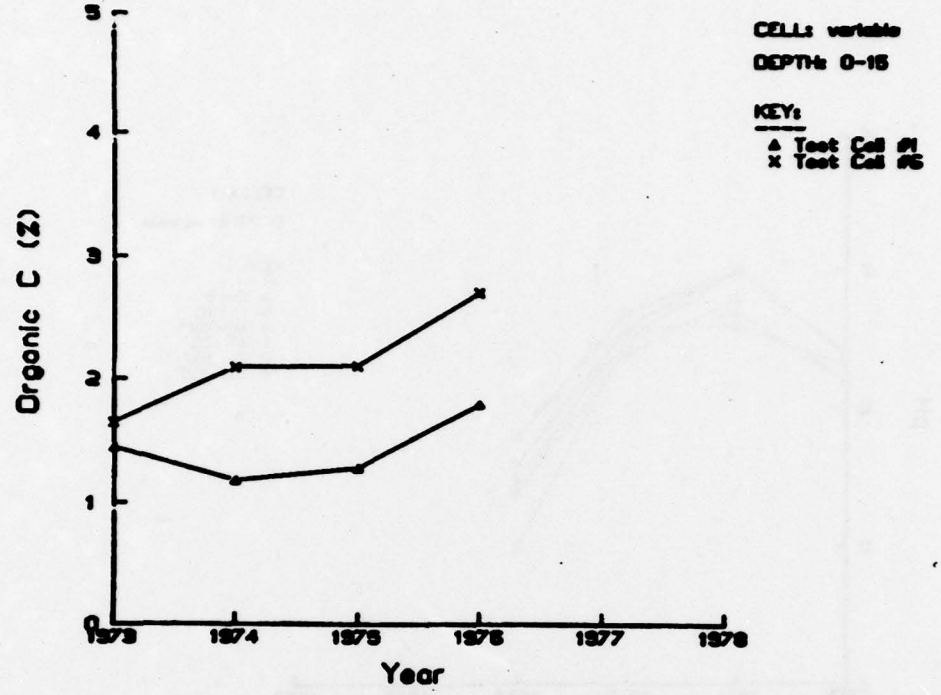


Figure 10. Changes in soil organic carbon in top soils from test cells 1 and 6.

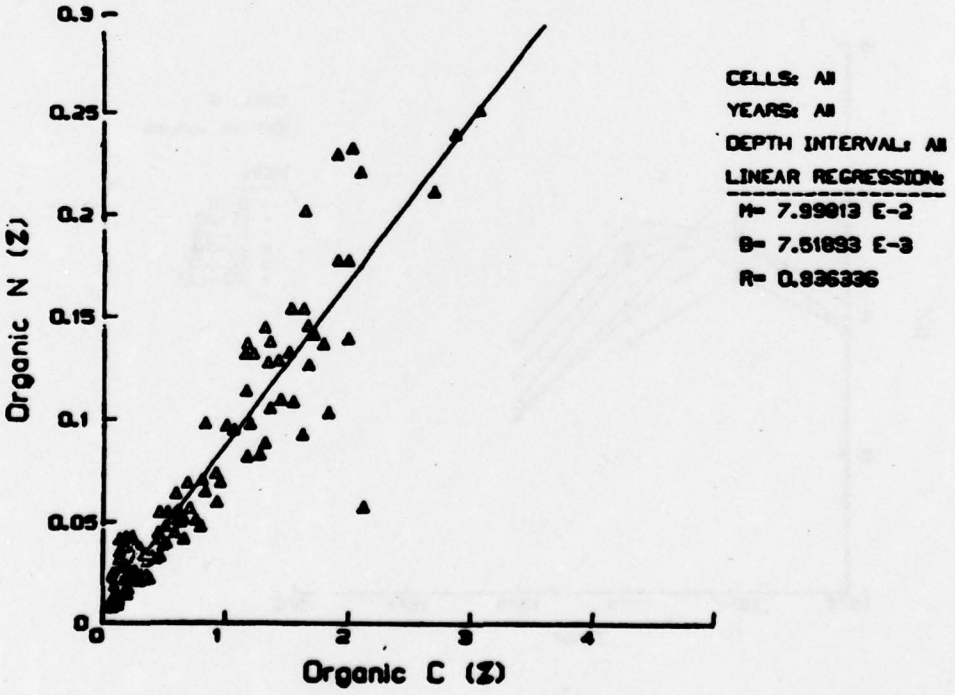


Figure 11. Correlation between organic-C and organic-N in soil.

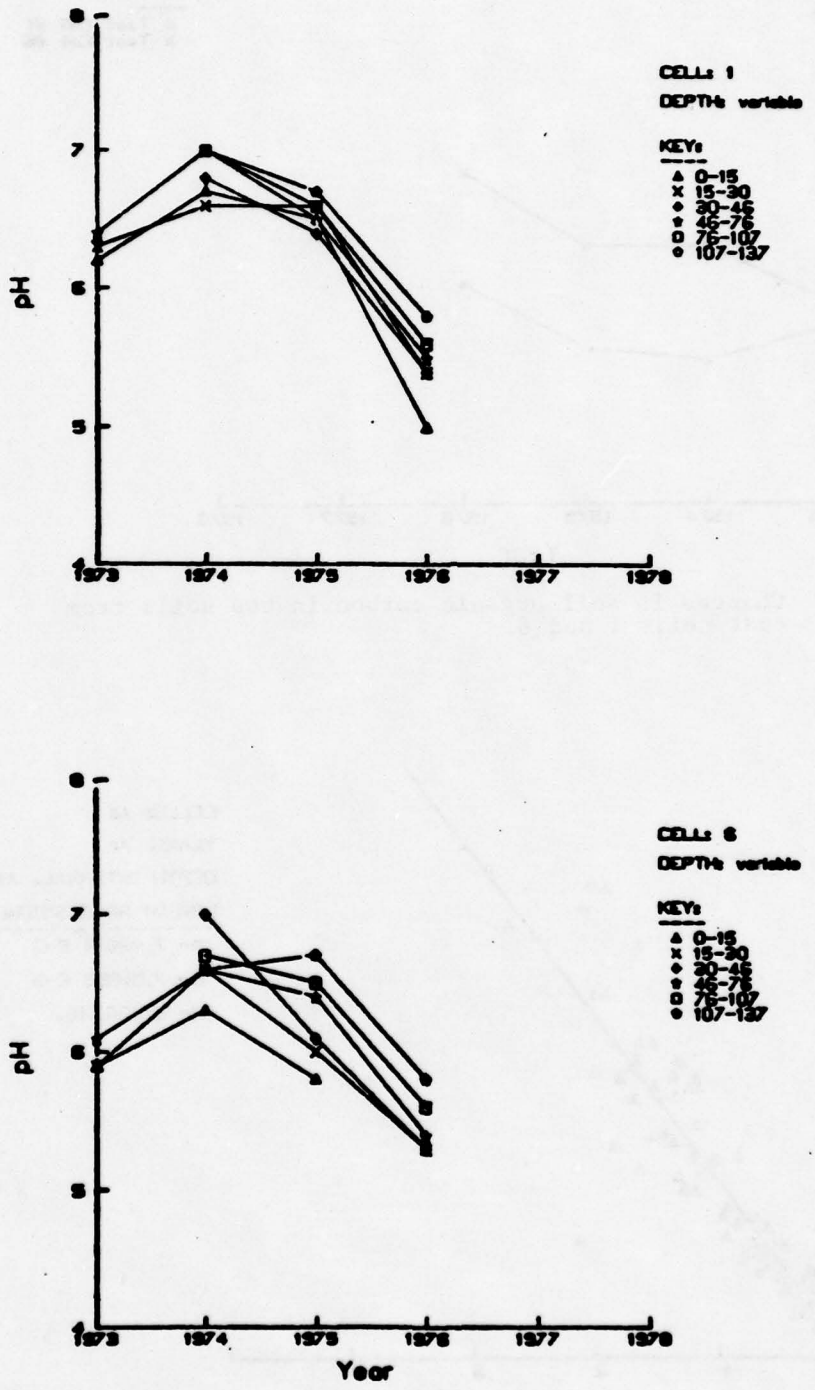


Fig. 12. Changes in soil pH in test cells 1 and 6 with depth.

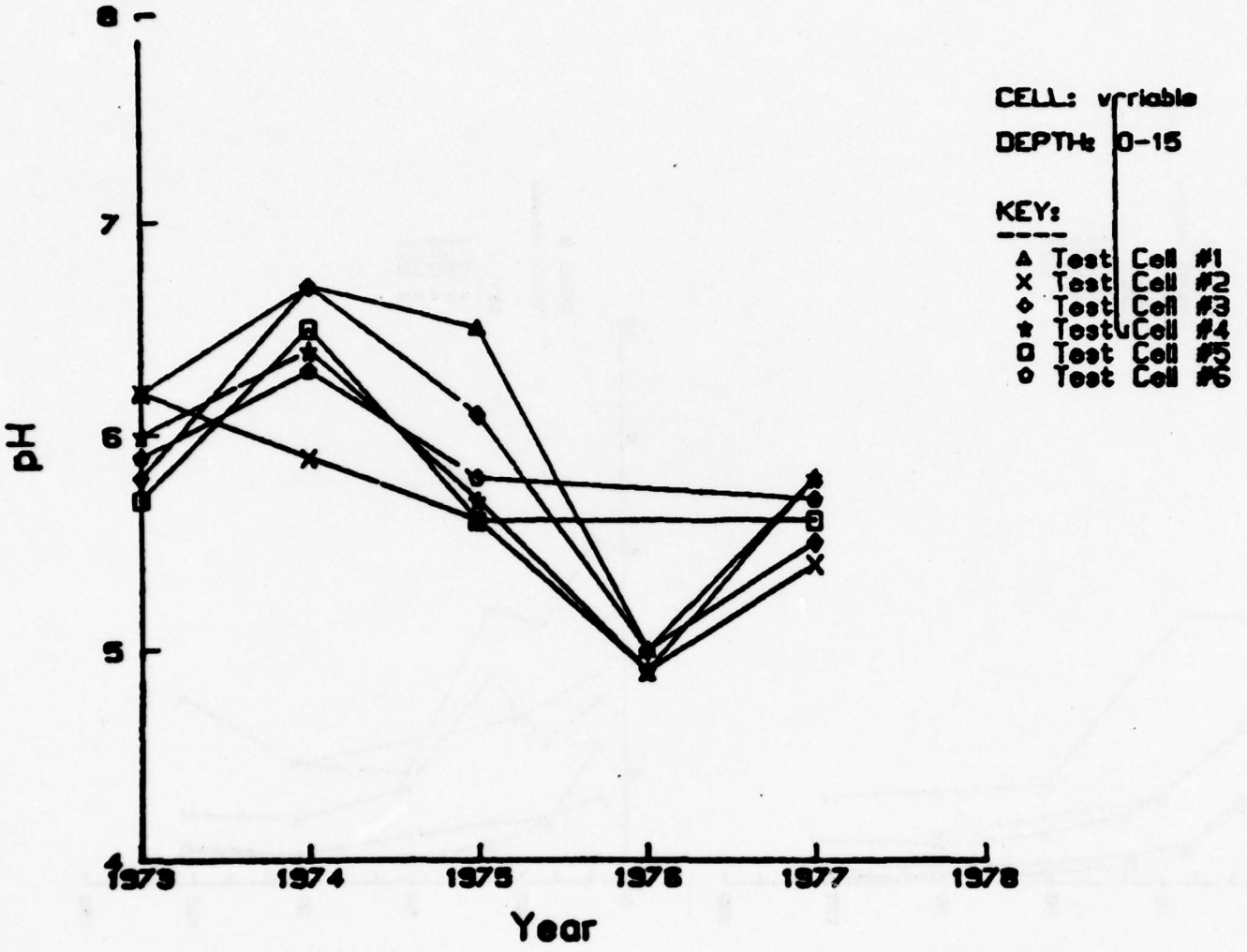


Fig. 13. Changes in soil pH in the top 15cm of all the test cells.

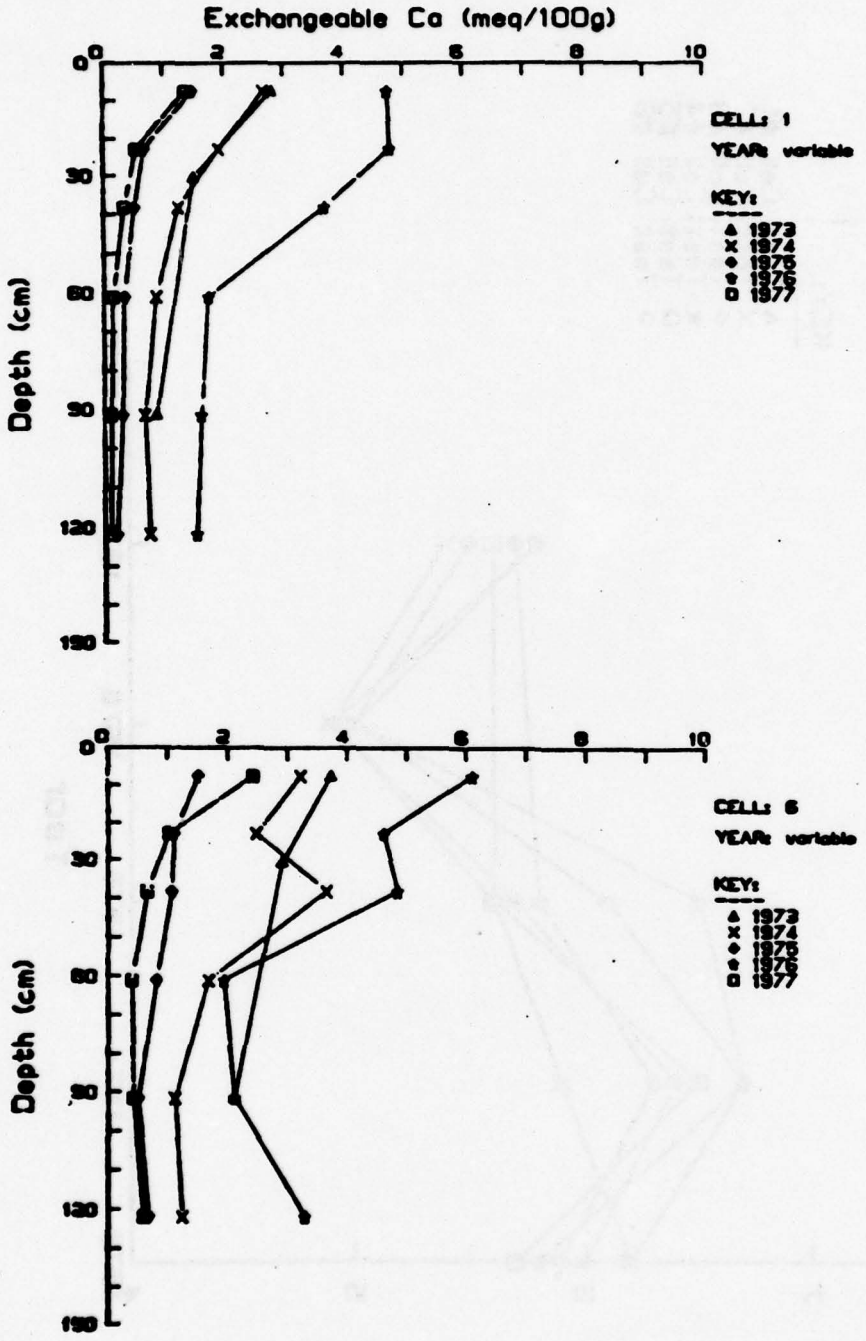


Fig. 14. Changes in exchangeable Ca in test cells 1 and 6 with depth.

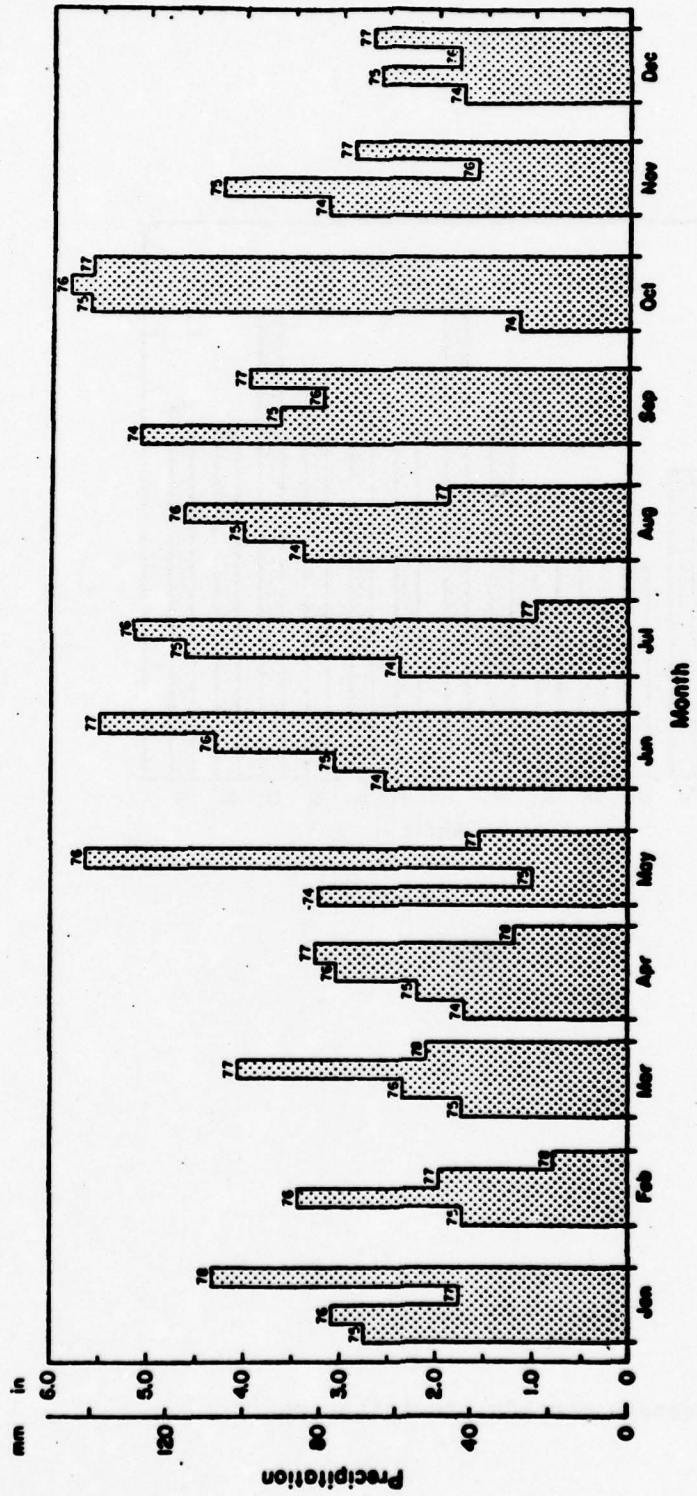


Fig. 15. Monthly variation in precipitation.

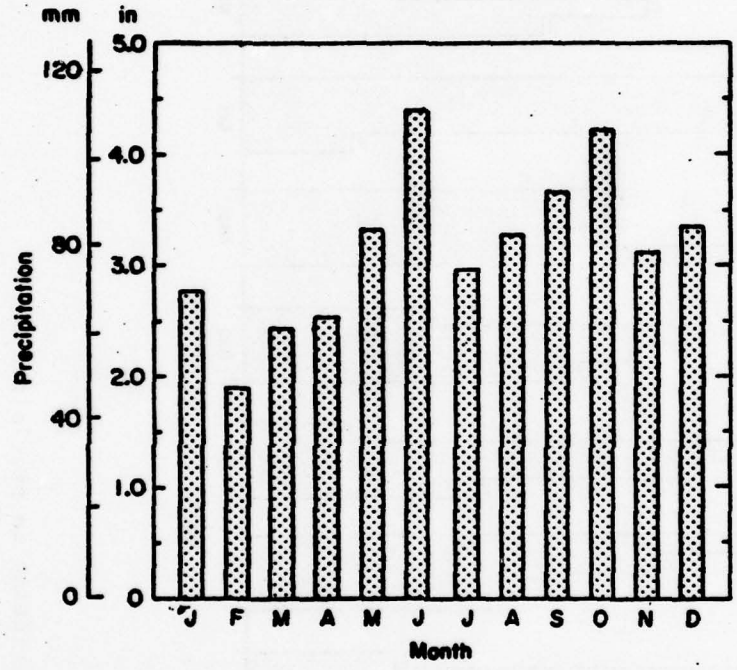


Fig. 16. Average monthly precipitation.

Table 1. Wastewater loading rate for CRREL test cells[1]

Application Period	Test Cell 1	2	3	4	5	6
	Windsor Soil			Charlton Soil		
1973-1974	2-S* (1d)†	4-S (2d)	2-P (2d)	2-P (2d)	4-S (2d)	2-S (1d)
1974-1975	2-S (1d)	6-S (3d)	3-P (3d)	3-P (3d)	3-P (24h)**	2-S (1d)
1975-1976	2-S (1d)	6-S (3d)	3-P (3d)	3-P (3d)	3-P (24h)**	2-S (1d)
1976-1977	2-S (1d)	1-4.8+P (1-4d)	1-4.4P (1-4d)	1-4.4P (1-4d)	1-4.3P (1-4d)	2-S (1d)
1977-1978	2-S (1d)	3-P (1-1/2d)	3-P (1-1/2d)	3-P (1-1/2d)	3-P (1-1/2d)	2-S (1d)

(1) From Jenkins et al. (1978)
* inches of secondary effluent per week, P means primary effluent
† d is the number of daily (8-hour) application per week
** 24h application over one 24-hour period
+ weekly applications varied between 1 and 4.8 in./wk.

Table 2. Periods of Test Cell Wastewater Application*

Year	Test Cell	Application Season
1973-1974	1	13 June '73 - 26 Nov '73, 22 Apr '74 - 31 May '74
	2	9 June '73 - 26 Nov '73, 17 Apr '74 - 31 May '74
	3	13 June '73 - 12 Dec '73, 22 Apr '74 - 31 May '74
	4	13 June '73 - 12 Dec '73, 22 Apr '74 - 31 May '74
	5	11 June '73 - 26 Nov '73, 17 Apr '74 - 31 May '74
	6	13 June '73 - 26 Nov '73, 22 Apr '74 - 31 May '74
1874-1975	1	2 June '74 - 31 May '75
	2	2 June '74 - 31 May '75
	3	2 June '74 - 31 May '75
	4	2 June '74 - 31 May '75
	5	2 June '74 - 31 May '75
	6	2 June '74 - 31 May '75
1975-1976	1	16 June '75 - 25 Jan '76, 26 Apr '76 - 31 May '76
	2	16 June '75 - 4 Jan '76, 17 May '76 - 31 May '76
	3	16 June '75 - 30 Nov '75
	4	16 June '75 - 30 Nov '75
	5	16 June '75 - 30 Nov '75
	6	16 June '75 - 31 May '76
1976-1977	1	1 June '76 - 3 Dec '76, 21 Apr '77 - 31 May '77
	2	8 July '76 - 3 Dec '76, 21 Apr '77 - 31 May '77
	3	8 July '76 - 3 Dec '76, 21 Apr '77 - 31 May '77
	4	8 July '76 - 3 Dec '76, 21 Apr '77 - 31 May '77
	5	8 July '76 - 3 Dec '76, 7 May '77 - 31 May '77
	6	1 June '76 - 3 Dec '76, 21 Apr '77 - 31 May '77
1977-1978	1	14 June '77 - 6 Sep '77, 10 Apr '78 - 24 May '78
	2	14 June '77 - 6 Sep '77, 16 May '78 - 23 May '78
	3	14 June '77 - 6 Sep '77, 16 May '78 - 22 May '78
	4	15 June '77 - 7 Sep '77, 16 May '78 - 22 May '78
	5	15 June '77 - 7 Sep '77, 16 May '78 - 23 May '78
	6	14 June '77 - 6 Sep '77, 10 Apr '78 - 24 May '78

* Jenkins et al. (1978)

Table 3. Selected soil physical properties of Windsor and Charlton Soils.

	Db g/c	Specific Gravity (G_s)	Void Ratio (e)	Permeability K_T cm/sec x 10^{-4}	T°C	Temperature Factor	K_{20} °C cm/sec x 10^{-4}	Average K_{20} cm/sec x 10^{-4}
				Windsor Soil				
"A" Horizon	1.335	1.63	.969	4.57	27.6	0.835	3.82	3.82
	"	"	"	"	"	"	"	"
	1.400	"	.876	2.02	27.5	0.84	1.70	1.70
	"	"	"	2.03	27.5	0.84	1.71	
"B" Horizon	1.508	2.69	.783	25.89	27.6	0.84	21.75	21.28
	"	"	"	24.79	27.6	0.84	20.82	
	1.644	"	.637	11.94	27.4	0.84	9.39	9.35
	"	"	"	11.79	27.4	0.84	9.28	
	1.549	"	.736	20.68	26.8	0.85	17.58	17.71
		"	"	20.99	26.8	0.85	17.84	
	1.637	"	.605	9.65	26.8	0.85	8.20	8.22
		"	"	9.64	26.8	0.85	8.24	
"C" Horizon	1.657	2.69	.623	9.62	26.7	0.85	8.18	8.22
		"	"	9.73	26.7	0.85	8.27	
	1.760	"	.529	4.65	26.7	0.85	3.95	3.97
	"	"	"	4.70	26.7	0.85	3.99	
				Charlton Soil				
"A" Horizon	1.048	2.63	1.506	3.58	27.5	0.84	2.96	3.00
	"	"	"	3.62	27.5	0.84	3.03	
	1.100	"	1.392	0.87	27.5	0.84	0.73	0.72
	"	"	"	0.84	27.5	0.84	0.71	
"B" Horizon	1.420	2.69	.894	1.37	26.4	0.86	1.178	1.18
	"	"	"	1.37	26.4	0.86	1.178	
	1.502	"	.792	0.23	26.4	0.86	0.20	0.20
	"	"	"	0.24	26.4	0.86	0.21	
"C" Horizon	1.695	2.70	.592	0.182	27.4	0.85	0.155	0.160
	"	"	"	0.193	27.9	0.83	0.160	
	"	"	"	0.178	23.0	0.92	0.164	
	1.719	"	.570	0.129	22.6	0.94	0.121	0.121
	"	"	"	0.130	22.6	0.94	0.122	

Db = bulk density, g/cm^3

e = Void Ratio - $\frac{\text{Volume Voids}}{\text{Volume Solids}}$

K_T = permeability at a temp. T°C

Table 4. Free iron oxides, organic-C, Organic-N, pH, and specific conductance in soil samples from test cells.

Test Cell	Soil	Depth cm	Year Anal	% < 2mm	Free Iron Oxides %	Org-C %	Org-N %	pH	Cond mmho /cm
	Windsor A		1975	97.7		1.64	0.154	5.0	0.82
	Windsor B		1975	98.8		0.60	0.055	6.2	0.37
	Windsor C		1975	98.4		0.16	0.019	6.9	0.27
	Charlton A		1975	85.3		2.00	0.178	5.7	0.29
	Charlton B		1975	87.3		0.96	0.070	5.5	0.48
	Charlton C		1975	85.2		0.28	0.035	7.0	0.30
1	Windsor	0 - 15	1973		1.03	1.45	0.110	6.2	0.43
1	Windsor	15 - 46	1973		1.00	0.62	0.056	6.3	0.37
1	Windsor	46 - 137	1973		0.79	0.21	0.022	6.4	0.35
2	Windsor	0 - 15	1973		1.50	1.55	0.109	6.2	0.50
2	Windsor	15 - 46	1973		1.19	0.65	0.052	6.3	0.34
2	Windsor	46 - 137	1973		0.55	0.21	0.017	6.5	0.29
3	Windsor	0 - 15	1973		1.35	1.68	0.127	5.8	0.48
3	Windsor	15 - 46	1973		1.27	0.59	0.045	6.0	0.35
3	Windsor	46 - 137	1973		0.87	0.17	0.018	6.6	0.31
4	Charlton	0 - 15	1973		1.58	2.04	0.233	6.0	0.53
4	Charlton	15 - 46	1973		1.20	1.16	0.132	6.2	0.44
4	Charlton	46 - 137	1973		1.37	0.27	0.039	6.5	0.33
5	Charlton	0 - 15	1973		1.58	2.13	0.058	5.7	0.49
5	Charlton	15 - 46	1973		1.11	1.36	0.138	6.0	0.38
5	Charlton	46 - 137	1973		1.82	0.36	0.031	6.2	0.36
6	Charlton	0 - 15	1973		1.50	1.65	0.202	5.9	0.62
6	Charlton	15 - 46	1973		1.19	1.35	0.128	5.9	0.41
6	Charlton	46 - 137	1973		1.90	0.31	0.037	6.1	0.29
1	Windsor	0 - 15	1974	98.9	1.42	1.18	0.137	6.7	0.25
1	Windsor	15 - 30	1974	98.6	1.24	0.71	0.057	6.6	0.30
1	Windsor	30 - 46	1974	98.2	1.11	0.48	0.042	6.8	0.22
1	Windsor	46 - 76	1974	98.5	0.60	0.09	0.010	7.0	0.15
1	Windsor	76 - 107	1974	99.3	0.67	0.08	0.008	7.0	0.15
1	Windsor	107 - 137	1974	98.8	0.61	0.13	0.011	7.0	0.10
2	Windsor	0 - 15	1974	98.4	1.13	1.17	0.114	5.9	0.43
2	Windsor	15 - 30	1974	99.3	0.96	0.53	0.055	6.4	0.25
2	Windsor	30 - 46	1974	99.2	0.74	0.34	0.035	6.2	0.30
2	Windsor	46 - 76	1974	97.5	0.66	0.15	0.016	6.4	0.19
2	Windsor	76 - 107	1974	99.1	0.60	0.16	0.015	6.7	0.15
2	Windsor	107 - 137	1974	98.2	0.62	0.09	0.013	6.6	0.13
3	Windsor	0 - 15	1974	99.6	1.28	1.64	0.154	6.7	0.34
3	Windsor	15 - 30	1974	99.0	1.34	0.69	0.069	6.4	0.24
3	Windsor	30 - 46	1974	98.2	0.95	0.50	0.039	6.5	0.20
3	Windsor	46 - 76	1974	98.0	0.64	0.19	0.022	6.7	0.11
3	Windsor	76 - 107	1974	99.0	0.71	0.12	0.013	6.8	0.10
3	Windsor	107 - 137	1974	99.3	0.63	0.11	0.010	6.9	0.10
4	Charlton	0 - 15	1974	87.4	1.43	1.92	0.230	6.4	0.35
4	Charlton	15 - 30	1974	82.8	1.29	1.32	0.145	6.0	0.25
4	Charlton	30 - 46	1974	89.4	1.28	1.01	0.097	6.3	0.14
4	Charlton	46 - 76	1974	90.5	1.22	0.23	0.029	6.3	0.14
4	Charlton	76 - 107	1974	88.4	1.13	0.18	0.018	6.7	0.13
4	Charlton	107 - 137	1974	85.7	1.10	0.13	0.022	6.6	0.10
5	Charlton	0 - 15	1974	89.9	1.36	1.92	0.178	6.5	0.35
5	Charlton	15 - 30	1974	91.5	1.34	1.23	0.132	6.1	0.22
5	Charlton	30 - 46	1974	93.7	1.40	1.07	0.095	6.3	0.15
5	Charlton	46 - 76	1974	90.4	1.23	0.60	0.064	6.5	0.16
5	Charlton	76 - 107	1974	91.3	0.68	0.17	0.022	6.7	0.20
5	Charlton	107 - 137	1974	86.0	0.54	0.13	0.015	7.1	0.13
6	Charlton	0 - 15	1974	81.9	1.52	2.10	0.221	6.3	0.20
6	Charlton	15 - 30	1974	92.7	1.41	1.53	0.154	6.6	0.20
6	Charlton	30 - 46	1974	89.3	1.25	0.84	0.098	7.0	0.20
6	Charlton	46 - 76	1974	91.3	1.33	0.45	0.045	6.6	0.15
6	Charlton	76 - 107	1974	91.4	1.22	0.21	0.025	6.7	0.14
6	Charlton	107 - 137	1974	90.9	0.86	0.20	0.028	6.6	0.13
1	Windsor	0 - 15	1975	100.0		1.28	0.083	6.5	0.39
1	Windsor	15 - 30	1975	100.0		0.66	0.052	6.6	0.24
1	Windsor	30 - 46	1975	100.0		0.51	0.048	6.4	0.19
1	Windsor	46 - 76	1975	93.3		0.19	0.029	6.5	
1	Windsor	76 - 107	1975	100.0		0.11	0.023	6.6	0.27
1	Windsor	107 - 137	1975	95.7		0.10	0.019	6.7	0.30

Table 4 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	% < 2mm	Free Iron Oxides %	Org-C %	Org-N %	pH	Cond mmho /cm
2	Windsor	0 - 15	1975	100.0		1.84	0.104	5.9	0.31
2	Windsor	15 - 30	1975	100.0		1.18	0.082	5.6	0.31
2	Windsor	30 - 46	1975	100.0		0.47	0.033	5.4	0.24
2	Windsor	46 - 76	1975	100.0		0.14	0.032	5.7	0.23
2	Windsor	76 - 107	1975	100.0		0.11	0.025	5.9	0.25
2	Windsor	107 - 137	1975	100.0		0.10	0.023	6.0	0.22
3	Windsor	0 - 15	1975	100.0		1.63	0.093	6.1	0.30
3	Windsor	15 - 30	1975	100.0		0.63	0.053	6.1	0.17
3	Windsor	30 - 46	1975	100.0		0.50	0.039	6.2	0.16
3	Windsor	46 - 76	1975	100.0		0.14	0.036	6.3	0.25
3	Windsor	76 - 107	1975	100.0		0.09	0.025	6.3	0.22
3	Windsor	107 - 137	1975	100.0		0.09	0.024	6.2	0.44
4	Charlton	0 - 15	1975	80.4		1.86		5.7	0.50
4	Charlton	15 - 30	1975	81.7		1.13		5.8	0.32
4	Charlton	30 - 46	1975	82.1		0.94		5.9	0.30
4	Charlton	46 - 76	1975	80.8		0.18	0.042	6.0	0.30
4	Charlton	76 - 107	1975	88.0		0.30	0.038	6.4	0.29
4	Charlton	107 - 137	1975	84.4		0.17	0.029	6.6	0.25
5	Charlton	0 - 15	1975	81.3		2.19		5.6	0.22
5	Charlton	15 - 30	1975	86.7		1.62		5.7	0.22
5	Charlton	30 - 46	1975	90.2		0.93	0.060	5.8	0.16
5	Charlton	46 - 76	1975	87.8		0.61	0.051	5.9	0.34
5	Charlton	76 - 107	1975	87.2		0.24	0.043	6.2	0.18
5	Charlton	107 - 137	1975	82.9		0.19	0.038	6.4	0.14
6	Charlton	0 - 15	1975	84.4		2.11		5.8	0.30
6	Charlton	15 - 30	1975	81.7		1.28		6.0	0.21
6	Charlton	30 - 46	1975	84.1		0.81	0.071	6.1	0.11
6	Charlton	46 - 76	1975	84.5		0.46	0.055	6.4	0.29
6	Charlton	76 - 107	1975	89.9		0.19	0.043	6.5	0.13
6	Charlton	107 - 137	1975	88.0		0.14	0.042	6.7	0.27
1	Windsor	0 - 15	1976	97.9	0.98	1.80	0.137	5.0	0.25
1	Windsor	15 - 30	1976	98.7	0.90	0.92	0.074	5.4	0.19
1	Windsor	30 - 46	1976	96.9	0.92	0.67	0.042	5.4	0.18
1	Windsor	46 - 76	1976	98.0	0.72	0.28	0.027	5.5	0.17
1	Windsor	76 - 107	1976	98.0	0.69	0.20	0.014	5.6	0.17
1	Windsor	107 - 137	1976	97.5	0.68	0.12	0.009	5.8	0.18
2	Windsor	0 - 15	1976	98.9	1.01	2.00	0.140	4.9	0.20
2	Windsor	15 - 30	1976	93.8	0.92	0.84	0.065	5.0	0.18
2	Windsor	30 - 46	1976	98.3	0.83	0.76	0.051	5.3	0.20
2	Windsor	46 - 76	1976	98.0	0.76	0.24	0.024	5.4	0.17
2	Windsor	76 - 107	1976	98.0	0.74	0.16	0.016	5.5	0.18
2	Windsor	107 - 137	1976	99.0	0.64	0.16	0.015	5.3	0.19
3	Windsor	0 - 15	1976	96.8	1.07	1.72	0.142	5.0	0.17
3	Windsor	15 - 30	1976	98.8	1.00	1.32	0.089	5.2	0.18
3	Windsor	30 - 46	1976	97.3	0.86	0.80	0.048	5.3	0.20
3	Windsor	46 - 76	1976	97.1	0.73	0.26	0.022	5.6	0.15
3	Windsor	76 - 107	1976	99.1	0.68	0.18	0.017	5.6	0.17
3	Windsor	107 - 137	1976	98.8	0.70	0.16	0.014	5.5	0.16
4	Charlton	0 - 15	1976	92.0	1.21	2.88	0.240	4.9	0.23
4	Charlton	15 - 30	1976	79.5	1.03	1.67	0.146	4.9	0.22
4	Charlton	30 - 46	1976	91.5	1.00	1.52	0.133	5.0	0.26
4	Charlton	46 - 76	1976	92.5	0.91	0.64	0.050	5.2	0.30
4	Charlton	76 - 107	1976	93.4	0.82	0.44	0.032	6.3	0.31
4	Charlton	107 - 137	1976	90.5	0.80	0.36	0.024	6.2	0.28
5	Charlton	0 - 15	1976	89.5		3.07	0.252		
5	Charlton	15 - 30	1976	92.3		1.43	0.129	5.0	0.26
5	Charlton	30 - 46	1976						
5	Charlton	46 - 76	1976	90.3	1.02	0.63	0.051	5.3	0.25
5	Charlton	76 - 107	1976	85.6	0.85	0.40	0.033	5.4	0.21
5	Charlton	107 - 137	1976	90.7	0.82	0.39	0.022	5.8	0.24
6	Charlton	0 - 15	1976	90.6		2.71	0.212		
6	Charlton	15 - 30	1976	90.9	1.08	1.36	0.106	5.3	0.23
6	Charlton	30 - 46	1976	89.4	0.90	1.20	0.098	5.3	0.27
6	Charlton	46 - 76	1976	87.3	0.87	0.52	0.040	5.4	0.22
6	Charlton	76 - 107	1976	89.8	0.74	0.28	0.028	5.6	0.20
6	Charlton	107 - 137	1976	85.4	0.87	0.30	0.021	5.8	0.19

Table 4 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	% < 2mm	Free Iron Oxides %	Org-C %	Org-N %	pH	Cond mmho /cm
1	Windsor	0 - 15	1977			1.55		5.8	
1	Windsor	15 - 30	1977			.74		6.1	
1	Windsor	30 - 46	1977			.50		6.2	
1	Windsor	46 - 76	1977			.15		6.2	
1	Windsor	76 - 107	1977			--		6.4	
1	Windsor	107 - 137	1977			.09		6.4	
2	Windsor	0 - 15	1977			2.00		5.4	
2	Windsor	15 - 30	1977			1.14		5.6	
2	Windsor	46 - 137	1977			.18		5.5	
3	Windsor	0 - 15	1977			1.76		5.5	
3	Windsor	15 - 30	1977			.71		5.6	
3	Windsor	46 - 137	1977			.09		5.6	
4	Charlton	0 - 15	1977			2.33		5.8	
4	Charlton	15 - 30	1977			1.62		5.8	
4	Charlton	46 - 137	1977			.33		5.7	
5	Charlton	0 - 15	1977			2.21		5.6	
5	Charlton	15 - 30	1977			.15		6.0	
5	Charlton	46 - 137	1977			.18		5.8	
6	Charlton	0 - 15	1977			2.42		5.7	
6	Charlton	15 - 30	1977			1.46		5.7	
6	Charlton	30 - 46	1977			1.11		5.6	
6	Charlton	46 - 76	1977			.45		5.7	
6	Charlton	76 - 107	1977			.15		6.0	
6	Charlton	107 - 137	1977			.21		6.3	
1	Windsor	0 - 15	1978			1.17		5.1	
1	Windsor	15 - 30	1978			.59		5.4	
1	Windsor	30 - 46	1978			.38		5.1	
1	Windsor	46 - 76	1978			.08		5.9	
1	Windsor	76 - 107	1978			.09		5.9	
1	Windsor	107 - 137	1978			.03		5.6	
2	Windsor	0 - 15	1978			1.55		5.0	
2	Windsor	15 - 30	1978			.66		5.1	
2	Windsor	46 - 137	1978			.14		5.2	
3	Windsor	0 - 15	1978			1.59		5.8	
3	Windsor	15 - 30	1978			.59		5.8	
3	Windsor	46 - 137	1978			.11		5.8	
4	Charlton	0 - 15	1978			2.13		5.6	
4	Charlton	15 - 30	1978			.93		5.5	
4	Charlton	46 - 137	1978			.15		5.7	
5	Charlton	0 - 15	1978			1.83		5.3	
5	Charlton	15 - 30	1978			.95		5.6	
5	Charlton	46 - 137	1978			.12		5.7	
6	Charlton	0 - 15	1978			1.82		5.7	
6	Charlton	15 - 30	1978			1.28		5.3	
6	Charlton	30 - 46	1978			.97		5.3	
6	Charlton	46 - 76	1978			.48		5.9	
6	Charlton	76 - 107	1978			.24		6.4	
6	Charlton	107 - 137	1978			.05		5.9	

Table 5. Cation exchange capacity and exchangeable cations in soil samples from CRREL test cells.

Test Cell	Soil	Depth cm	Year Anal	CEC meq/ 100g	Exch Ca meq/ 100g	Exch Mg meq/ 100g	Exch K meq/ 100g	Exch Na meq/ 100g	Exch NH4 meq/ 100g
	Windsor A		1975	6.7	1.02	0.08	0.10	0.07	
	Windsor B		1975	3.5	0.71	0.04	0.03	0.06	
	Windsor C		1975	1.8	1.49	0.08	0.05	0.07	
	Charlton A		1975	11.3	0.53	0.13	0.06	0.07	
	Charlton B		1975	7.3	0.80	0.07	0.05	0.05	
	Charlton C		1975	3.4	1.04	0.05	0.06	0.05	

Table 5 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	CEC meq/ 100g	Exch Ca meq/ 100g	Exch Mg meq/ 100g	Exch K meq/ 100g	Exch Na meq/ 100g	Exch NH4 meq/ 100g
1	Windsor	0 - 15	1973	6.8	2.81	0.23	0.08	0.07	
1	Windsor	15 - 46	1973	2.1	1.50	0.10	0.03	0.08	
1	Windsor	46 - 137	1973	1.7	0.87	0.06	0.01	0.03	
2	Windsor	0 - 15	1973	6.9	2.87	0.24	0.09	0.03	
2	Windsor	15 - 46	1973	3.8	1.51	0.12	0.02	0.03	
2	Windsor	46 - 137	1973	1.5	1.40	0.07	0.01	0.05	
3	Windsor	0 - 15	1973	7.6	3.18	0.20	0.13	0.05	
3	Windsor	15 - 46	1973	3.4	1.56	0.09	0.05	0.04	
3	Windsor	46 - 137	1973	1.8	1.26	0.10	0.04	0.03	
4	Charlton	0 - 15	1973	12.2	4.11	0.41	0.18	0.10	
4	Charlton	15 - 46	1973	7.8	3.62	0.27	0.06	0.07	
4	Charlton	46 - 137	1973	3.6	2.25	0.19	0.07	0.06	
5	Charlton	0 - 15	1973	12.1	3.61	0.40	0.14	0.05	
5	Charlton	15 - 46	1973	8.3	2.69	0.23	0.06	0.07	
5	Charlton	46 - 137	1973	3.6	2.06	0.21	0.06	0.06	
6	Charlton	0 - 15	1973	11.0	3.75	0.38	0.08	0.07	
6	Charlton	15 - 46	1973	8.9	2.93	0.23	0.05	0.05	
6	Charlton	46 - 137	1973	3.7	2.11	0.17	0.06	0.08	
1	Windsor	0 - 15	1974	13.1	2.68	0.64	0.14	0.46	
1	Windsor	15 - 30	1974	4.4	1.94	0.85	0.03	0.40	
1	Windsor	30 - 46	1974	3.3	1.25	0.19	0.02	0.33	
1	Windsor	46 - 76	1974	1.4	0.87	0.07	0.02	0.26	
1	Windsor	76 - 107	1974	1.3	0.69	0.07	0.03	0.23	
1	Windsor	107 - 137	1974	1.4	0.75	0.07	0.02	0.22	
2	Windsor	0 - 15	1974	7.2	2.56	0.58	0.16	0.35	
2	Windsor	15 - 30	1974	3.4	1.12	0.12	0.09	0.24	
2	Windsor	30 - 46	1974	3.0	1.06	0.16	0.08	0.25	
2	Windsor	46 - 76	1974	2.2	0.69	0.09	0.03	0.30	
2	Windsor	76 - 107	1974	1.7	0.75	0.13	0.03	0.27	
2	Windsor	107 - 137	1974	1.2	0.81	0.19	0.05	0.28	
3	Windsor	0 - 15	1974	8.7	3.24	0.44	0.14	0.40	
3	Windsor	15 - 30	1974	3.8	1.44	0.12	0.03	0.34	
3	Windsor	30 - 46	1974	3.7	1.50	0.15	0.03	0.32	
3	Windsor	46 - 76	1974	2.2	1.25	0.09	0.03	0.28	
3	Windsor	76 - 107	1974	1.4	0.69	0.07	0.03	0.26	
3	Windsor	107 - 137	1974	1.4	0.62	0.07	0.03	0.27	
4	Charlton	0 - 15	1974	12.0	3.99	0.61	0.28	0.50	
4	Charlton	15 - 30	1974	8.8	2.68	0.24	0.08	0.43	
4	Charlton	30 - 46	1974	7.1	1.94	0.21	0.07	0.36	
4	Charlton	46 - 76	1974	3.3	1.37	0.19	0.08	0.33	
4	Charlton	76 - 107	1974	3.2	1.56	0.19	0.07	0.30	
4	Charlton	107 - 137	1974	3.0	1.94	0.20	0.08	0.26	
5	Charlton	0 - 15	1974	12.3	2.99	0.40	0.37	0.47	
5	Charlton	15 - 30	1974	8.2	1.62	0.13	0.08	0.35	
5	Charlton	30 - 46	1974	7.4	1.37	0.07	0.05	0.34	
5	Charlton	46 - 76	1974	4.4	1.19	0.06	0.05	0.34	
5	Charlton	76 - 107	1974	3.1	1.06	0.04	0.05	0.30	
5	Charlton	107 - 137	1974	2.9	1.37	0.13	0.05	0.27	
6	Charlton	0 - 15	1974	12.2	3.24	0.35	0.22	0.52	
6	Charlton	15 - 30	1974	8.9	2.50	0.16	0.05	0.51	
6	Charlton	30 - 46	1974	6.6	3.68	0.13	0.05	0.38	
6	Charlton	46 - 76	1974	4.5	1.69	0.10	0.05	0.30	
6	Charlton	76 - 107	1974	3.4	1.12	0.07	0.06	0.22	
6	Charlton	107 - 137	1974	3.6	1.25	0.09	0.06	0.17	
1	Windsor	0 - 15	1975	5.9	1.48	0.19	0.06	0.09	
1	Windsor	15 - 30	1975	3.1	0.68	0.08	0.03	0.09	
1	Windsor	30 - 46	1975	2.5	0.51	0.05	0.04	0.11	
1	Windsor	46 - 76	1975	1.9	0.35	0.04	0.02	0.07	
1	Windsor	76 - 107	1975	1.5	0.32	0.03	0.02	0.06	
1	Windsor	107 - 137	1975	1.3	0.21	0.03	0.02	0.08	
2	Windsor	0 - 15	1975	5.1	1.21	0.14	0.06	0.12	
2	Windsor	15 - 30	1975	3.2	0.41	0.04	0.02	0.06	
2	Windsor	30 - 46	1975	3.1	0.20	0.02	0.01	0.04	
2	Windsor	46 - 76	1975	1.8	0.14	0.02	0.01	0.04	
2	Windsor	76 - 107	1975	1.6	0.18	0.02	0.06	0.04	
2	Windsor	107 - 137	1975	1.0	0.13	0.02	0.02	0.07	

Table 5 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	CEC meq/ 100g	Exch Ca meq/ 100g	Exch Mg meq/ 100g	Exch K meq/ 100g	Exch Na meq/ 100g	Exch NH4 meq/ 100g
3	Windsor	0 - 15	1975	5.7	1.19	0.12	0.10	0.12	
3	Windsor	15 - 30	1975	3.2	0.46	0.04	0.06	0.08	
3	Windsor	30 - 46	1975	2.7	0.34	0.03	0.03	0.05	
3	Windsor	46 - 76	1975	2.1	0.31	0.02	0.03	0.04	
3	Windsor	76 - 107	1975	1.5	0.22	0.01	0.02	0.04	
3	Windsor	107 - 137	1975	1.3	0.20	0.02	0.03	0.05	
4	Charlton	0 - 15	1975	8.5	2.18	0.22	0.13	0.23	
4	Charlton	15 - 30	1975	7.1	0.88	0.08	0.08	0.19	
4	Charlton	30 - 46	1975	5.6	0.59	0.05	0.05	0.11	
4	Charlton	46 - 76	1975	3.0	0.38	0.03	0.07	0.11	
4	Charlton	76 - 107	1975	2.9	0.63	0.04	0.04	0.09	
4	Charlton	107 - 137	1975	1.9	0.76	0.04	0.06	0.14	
5	Charlton	0 - 15	1975	9.3	2.37	0.23	0.11	0.15	
5	Charlton	15 - 30	1975	7.2	0.85	0.09	0.06	0.14	
5	Charlton	30 - 46	1975	5.3	0.61	0.06	0.05	0.11	
5	Charlton	46 - 76	1975	3.7	0.37	0.04	0.10	0.17	
5	Charlton	76 - 107	1975	3.5	0.46	0.04	0.05	0.13	
5	Charlton	107 - 137	1975	2.4	0.59	0.05	0.06	0.16	
6	Charlton	0 - 15	1975	10.3	1.52	0.17	0.07	0.13	
6	Charlton	15 - 30	1975	8.6	1.11	0.11	0.05	0.13	
6	Charlton	30 - 46	1975	5.9	1.08	0.08	0.04	0.14	
6	Charlton	46 - 76	1975	4.3	0.82	0.06	0.04	0.15	
6	Charlton	76 - 107	1975	3.3	0.52	0.03	0.04	0.13	
6	Charlton	107 - 137	1975	2.8	0.69	0.04	0.06	0.14	
1	Windsor	0 - 15	1976	10.4	4.75	0.81	0.31	0.21	
1	Windsor	15 - 30	1976	7.9	4.81	0.90	0.20	0.22	
1	Windsor	30 - 46	1976	5.3	3.69	0.79	0.14	0.20	
1	Windsor	46 - 76	1976	3.2	1.75	0.28	0.08	0.23	
1	Windsor	76 - 107	1976	2.5	1.63	0.28	0.08	0.20	
1	Windsor	107 - 137	1976	2.3	1.54	0.38	0.09	0.24	
2	Windsor	0 - 15	1976	11.1	4.56	0.74	0.24	0.15	
2	Windsor	15 - 30	1976	6.8	3.88	0.72	0.23	0.13	
2	Windsor	30 - 46	1976	6.8	3.56	0.66	0.14	0.16	
2	Windsor	46 - 76	1976	7.3	1.31	0.24	0.09	0.11	
2	Windsor	76 - 107	1976	2.3	1.69	0.37	0.19	0.15	
2	Windsor	107 - 137	1976	2.2	1.44	0.30	0.25	0.13	
3	Windsor	0 - 15	1976	11.2	5.06	0.53	0.30	0.17	
3	Windsor	15 - 30	1976	8.1	2.44	0.45	0.11	0.13	
3	Windsor	30 - 46	1976	5.8	2.25	0.43	0.14	0.13	
3	Windsor	46 - 76	1976	3.3	1.19	0.23	0.08	0.11	
3	Windsor	76 - 107	1976	2.5	1.94	0.29	0.06	0.12	
3	Windsor	107 - 137	1976	2.2	1.12	0.23	0.06	0.11	
4	Charlton	0 - 15	1976	20.5	4.19	0.69	0.19	0.36	
4	Charlton	15 - 30	1976	16.1	3.50	0.57	0.13	0.20	
4	Charlton	30 - 46	1976	11.7	2.94	0.51	0.20	0.33	
4	Charlton	46 - 76	1976	6.3	1.88	0.32	0.17	0.17	
4	Charlton	76 - 107	1976	5.8	4.56	0.47	0.16	0.21	
4	Charlton	107 - 137	1976	4.8	3.69	0.39	0.16	0.23	
5	Charlton	0 - 15	1976	20.7	5.13	0.71	0.23	0.36	
5	Charlton	15 - 30	1976	12.4	4.50	0.78	0.17	0.26	
5	Charlton	30 - 46	1976						
5	Charlton	46 - 76	1976	8.2	2.00	0.42	0.10	0.20	
5	Charlton	76 - 107	1976	2.8	2.06	0.33	0.13	0.21	
5	Charlton	107 - 137	1976	5.1	2.02	0.28	0.11	0.24	
6	Charlton	0 - 15	1976	16.4	6.12	0.92	0.19	0.31	
6	Charlton	15 - 30	1976	12.9	4.63	1.01	0.17	0.32	
6	Charlton	30 - 46	1976	12.0	4.87	0.92	0.18	0.34	
6	Charlton	46 - 76	1976	6.6	1.94	0.33	0.09	0.28	
6	Charlton	76 - 107	1976	4.1	2.12	0.30	0.07	0.27	
6	Charlton	107 - 137	1976	12.6	3.31	0.90	0.10	0.28	
1	Windsor	0 - 15	1977	7.2	1.36	0.13	0.08	0.18	0.072
1	Windsor	15 - 30	1977	3.6	0.56	0.05	0.02	0.18	0.018
1	Windsor	30 - 46	1977	2.7	0.34	0.04	0.02	0.19	0.018
1	Windsor	46 - 76	1977	1.1	0.16	0.02	0.02	0.13	0.018
1	Windsor	76 - 107	1977	1.0	0.12	0.01	0.02	0.11	0.019
1	Windsor	107 - 137	1977	1.0	0.11	0.01	0.02	0.12	0.019

Table 5 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	CEC meq/ 100g	Exch Ca meq/ 100g	Exch Mg meq/ 100g	Exch K meq/ 100g	Exch Na meq/ 100g	Exch NH4 meq/ 100g
2	Windsor	0 - 15	1977	9.6	1.55	0.05	0.18	0.10	0.055
2	Windsor	15 - 30	1977	5.9	0.84	0.15	0.07	0.12	0.036
2	Windsor	46 - 137	1977	1.3	0.07	0.02	0.03	0.07	0.019
3	Windsor	0 - 15	1977	8.3	1.33	0.23	0.13	0.12	0.056
3	Windsor	15 - 30	1977	5.3	0.40	0.07	0.04	0.10	0.037
3	Windsor	46 - 137	1977	1.1	0.07	0.01	0.04	0.07	0.019
4	Charlton	0 - 15	1977	15.4	2.90	0.33	0.23	0.14	0.093
4	Charlton	15 - 30	1977	16.2	1.33	0.15	0.19	0.18	0.056
4	Charlton	46 - 137	1977	4.2	0.36	0.04	0.07	0.14	0.019
5	Charlton	0 - 15	1977	12.9	6.49	0.51	0.18	0.22	0.074
5	Charlton	15 - 30	1977	3.2	0.63	0.03	0.05	0.20	0.019
5	Charlton	46 - 137	1977	3.5	0.31	0.03	0.05	0.14	0.019
6	Charlton	0 - 15	1977	12.9	2.44	0.19	0.14	0.21	0.110
6	Charlton	15 - 30	1977	9.0	1.03	0.10	0.07	0.30	0.073
6	Charlton	30 - 46	1977	7.4	0.67	0.05	0.06	0.27	0.032
6	Charlton	46 - 76	1977	4.8	0.41	0.03	0.04	0.24	0.031
6	Charlton	76 - 107	1977	3.7	0.43	0.02	0.05	0.29	0.011
6	Charlton	107 - 137	1977	3.1	0.61	0.02	0.07	0.19	0.010
1	Windsor	0 - 15	1978		1.31	0.11	0.07	0.08	
1	Windsor	15 - 30	1978		1.20	0.09	0.05	0.06	
1	Windsor	30 - 46	1978		0.54	0.04	0.05	0.04	
1	Windsor	46 - 76	1978		0.14	0.02	0.03	0.04	
1	Windsor	76 - 107	1978		0.10	0.02	0.03	0.06	
1	Windsor	107 - 137	1978		0.08	0.02	0.02	0.06	
2	Windsor	0 - 15	1978		3.98	0.53	0.11	0.08	
2	Windsor	15 - 30	1978		1.18	0.13	0.04	0.04	
2	Windsor	46 - 137	1978		0.08	0.02	0.03	0.03	
3	Windsor	0 - 15	1978		3.32	0.47	0.08	0.10	
3	Windsor	15 - 30	1978		0.78	0.15	0.04	0.05	
3	Windsor	46 - 137	1978		0.14	0.02	0.04	0.05	
4	Charlton	0 - 15	1978		4.04	0.55	0.11	0.09	
4	Charlton	15 - 30	1978		1.90	0.16	0.04	0.09	
4	Charlton	46 - 137	1978		0.62	0.05	0.08	0.07	
5	Charlton	0 - 15	1978		4.52	0.48	0.09	0.11	
5	Charlton	15 - 30	1978		2.18	0.11	0.04	0.12	
5	Charlton	46 - 137	1978		0.26	0.02	0.05	0.08	
6	Charlton	0 - 15	1978		3.66	0.24	0.11	0.17	
6	Charlton	15 - 30	1978		1.42	0.10	0.04	0.18	
6	Charlton	30 - 46	1978		0.94	0.04	0.03	0.16	
6	Charlton	46 - 76	1978		1.46	0.04	0.03	0.14	
6	Charlton	76 - 107	1978		1.58	0.02	0.05	0.12	
6	Charlton	107 - 137	1978						

Table 6. Total P, organic P, extractable and soluble P in soils from CRREL test cells.

Test Cell	Soil	Depth cm	Year Anal	Total P acid ppm	Total P ign ppm	Org-P ppm	Ext P ppm	Sol P ppm
	Windsor A		1975	445.0			72.0	6.10
	Windsor B		1975	255.0			67.0	3.20
	Windsor C		1975	305.0			67.0	5.00
	Charlton A		1975	530.0			71.0	5.10
	Charlton B		1975	395.0			44.0	1.40
	Charlton C		1975	295.0			65.0	9.30

Table 6 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	Total P acid ppm	Total P ism ppm	Org-P ppm	Ext P ppm	Sol P ppm
1	Windsor	0 - 15	1973	162.5			31.1	
1	Windsor	15 - 46	1973	126.5			36.6	
1	Windsor	46 - 137	1973	140.6			46.8	
2	Windsor	0 - 15	1973	182.8			32.6	
2	Windsor	15 - 46	1973	157.8			36.3	
2	Windsor	46 - 137	1973	162.5			44.4	
3	Windsor	0 - 15	1973	212.5			29.6	
3	Windsor	15 - 46	1973	178.1			33.8	
3	Windsor	46 - 137	1973	203.8			42.1	
4	Charlton	0 - 15	1973	465.6			27.7	
4	Charlton	15 - 46	1973	390.6			30.4	
4	Charlton	46 - 137	1973	268.8			36.6	
5	Charlton	0 - 15	1973	304.7			22.9	
5	Charlton	15 - 46	1973	228.1			28.5	
5	Charlton	46 - 137	1973	187.5			36.1	
6	Charlton	0 - 15	1973	282.8			20.7	
6	Charlton	15 - 46	1973	240.6			23.4	
6	Charlton	46 - 137	1973	203.1			36.2	
1	Windsor	0 - 15	1974	670.0	1191	723	64.0	1.99
1	Windsor	15 - 30	1974	446.0	839	510	62.0	0.66
1	Windsor	30 - 46	1974	362.0	691	396	56.0	0.24
1	Windsor	46 - 76	1974	332.0	620	275	60.0	0.16
1	Windsor	76 - 107	1974	298.0	678	293	63.0	0.18
1	Windsor	107 - 137	1974	320.0	660	275	57.0	0.16
2	Windsor	0 - 15	1974	624.0	1274	720	96.0	4.79
2	Windsor	15 - 30	1974	402.0	662	326	64.0	0.50
2	Windsor	30 - 46	1974	394.0	696	370	66.0	0.14
2	Windsor	46 - 76	1974	340.0	742	367	67.0	0.12
2	Windsor	76 - 107	1974	324.0	614	291	62.0	0.21
2	Windsor	107 - 137	1974	328.0	710	317	71.0	0.20
3	Windsor	0 - 15	1974	670.0	1170	622	65.0	3.41
3	Windsor	15 - 30	1974	462.0	699	373	51.0	0.52
3	Windsor	30 - 46	1974	422.0	671	335	56.0	0.34
3	Windsor	46 - 76	1974	468.0	715	344	59.0	0.18
3	Windsor	76 - 107	1974	350.0	682	322	64.0	0.14
3	Windsor	107 - 137	1974	362.0	661	308	66.0	0.10
4	Charlton	0 - 15	1974	884.0	1895	1180	76.0	4.22
4	Charlton	15 - 30	1974	758.0	1382	859	53.0	1.14
4	Charlton	30 - 46	1974	680.0	1189	723	36.0	0.93
4	Charlton	46 - 76	1974	468.0	805	434	42.0	1.22
4	Charlton	76 - 107	1974	430.0	745	395	45.0	1.00
4	Charlton	107 - 137	1974	446.0	810	406	42.0	0.89
5	Charlton	0 - 15	1974	948.0	1930	907	83.0	2.15
5	Charlton	15 - 30	1974	646.0	1339	828	53.0	0.64
5	Charlton	30 - 46	1974	590.0	1215	767	31.0	0.19
5	Charlton	46 - 76	1974	424.0	908	513	54.0	0.33
5	Charlton	76 - 107	1974	414.0	770	419	53.0	0.88
5	Charlton	107 - 137	1974	432.0	779	428	46.0	0.86
6	Charlton	0 - 15	1974	956.0	1795	1000	67.0	1.96
6	Charlton	15 - 30	1974	860.0	1380	758	49.0	1.07
6	Charlton	30 - 46	1974	568.0	1074	531	33.0	0.99
6	Charlton	46 - 76	1974	460.0	1009	551	53.0	0.85
6	Charlton	76 - 107	1974	406.0	819	399	56.0	0.79
6	Charlton	107 - 137	1974	440.0	770	356	47.0	0.84
1	Windsor	0 - 15	1975	510.0			136.0	12.10
1	Windsor	15 - 30	1975	390.0			93.0	8.30
1	Windsor	30 - 46	1975	275.0			62.0	4.70
1	Windsor	46 - 76	1975	245.0			66.0	7.00
1	Windsor	76 - 107	1975	200.0			50.0	1.80
1	Windsor	107 - 137	1975	255.0			60.0	0.90
2	Windsor	0 - 15	1975	790.0			187.0	13.10
2	Windsor	15 - 30	1975	405.0			95.0	4.60
2	Windsor	30 - 46	1975	255.0			60.0	1.40
2	Windsor	46 - 76	1975	255.0			67.0	0.90
2	Windsor	76 - 107	1975	260.0			64.0	0.70
2	Windsor	107 - 137	1975	220.0			55.0	0.40

Table 6 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	Total P acid ppm	Total P isn ppm	Org-P ppm	Ext P ppm	Sol P ppm
3	Windsor	0 - 15	1975	580.0			118.0	5.60
3	Windsor	15 - 30	1975	305.0			58.0	5.40
3	Windsor	30 - 46	1975	280.0			67.0	6.30
3	Windsor	46 - 76	1975	220.0			68.0	2.40
3	Windsor	76 - 107	1975	215.0			60.0	1.60
3	Windsor	107 - 137	1975	360.0			44.0	0.80
4	Charlton	0 - 15	1975	745.0			124.0	30.30
4	Charlton	15 - 30	1975	485.0			58.0	10.40
4	Charlton	30 - 46	1975	430.0			52.0	7.60
4	Charlton	46 - 76	1975	280.0			47.0	2.90
4	Charlton	76 - 107	1975	290.0			53.0	4.00
4	Charlton	107 - 137	1975	285.0			45.0	2.20
5	Charlton	0 - 15	1975	1000.0			177.0	16.40
5	Charlton	15 - 30	1975	565.0			70.0	9.30
5	Charlton	30 - 46	1975	463.0			47.0	13.80
5	Charlton	46 - 76	1975	370.0			43.0	7.90
5	Charlton	76 - 107	1975	270.0			49.0	12.10
5	Charlton	107 - 137	1975	255.0			45.0	7.30
6	Charlton	0 - 15	1975	675.0			103.0	21.00
6	Charlton	15 - 30	1975	490.0			41.0	10.60
6	Charlton	30 - 46	1975	400.0			29.0	13.10
6	Charlton	46 - 76	1975	345.0			46.0	13.50
6	Charlton	76 - 107	1975	235.0			44.0	6.60
6	Charlton	107 - 137	1975	295.0			41.0	3.40
1	Windsor	0 - 15	1976	690.0	726	258	152.0	1.10
1	Windsor	15 - 30	1976	431.0	477	171	90.0	1.00
1	Windsor	30 - 46	1976	386.0	418	148	89.0	0.40
1	Windsor	46 - 76	1976	319.0	336	75	73.0	0.20
1	Windsor	76 - 107	1976	401.0	383	65	77.0	0.10
1	Windsor	107 - 137	1976	280.0	283	29	71.0	0.10
2	Windsor	0 - 15	1976	881.0	897	240	195.0	1.10
2	Windsor	15 - 30	1976	469.0	470	178	93.0	0.50
2	Windsor	30 - 46	1976	452.0	469	163	86.0	0.30
2	Windsor	46 - 76	1976	396.0	413	107	80.0	0.20
2	Windsor	76 - 107	1976	380.0	396	109	78.0	0.10
2	Windsor	107 - 137	1976	378.0	412	80	72.0	0.10
3	Windsor	0 - 15	1976	760.0	805	306	162.0	0.70
3	Windsor	15 - 30	1976	535.0	551	226	104.0	0.30
3	Windsor	30 - 46	1976	416.0	425	184	81.0	0.20
3	Windsor	46 - 76	1976	339.0	384	81	77.0	0.10
3	Windsor	76 - 107	1976	328.0	389	76	74.0	0.10
3	Windsor	107 - 137	1976	309.0	345	60	69.0	0.10
4	Charlton	0 - 15	1976	1203.0	1255	483	153.0	0.60
4	Charlton	15 - 30	1976	902.0	915	351	112.0	0.70
4	Charlton	30 - 46	1976	796.0	807	324	58.0	0.20
4	Charlton	46 - 76	1976	559.0	577	183	75.0	0.30
4	Charlton	76 - 107	1976	501.0	479	116	66.0	0.10
4	Charlton	107 - 137	1976	476.0	488	124	52.0	0.10
5	Charlton	0 - 15	1976	1298.0	1502	428	218.0	1.10
5	Charlton	15 - 30	1976	900.0	914	315	73.0	0.80
5	Charlton	30 - 46	1976					
5	Charlton	46 - 76	1976	539.0	558	161	64.0	0.20
5	Charlton	76 - 107	1976	542.0	553	158	78.0	0.40
5	Charlton	107 - 137	1976	473.0	491	85	70.0	0.10
6	Charlton	0 - 15	1976	849.0	999	350	80.0	0.80
6	Charlton	15 - 30	1976	677.0	692	232	31.0	0.50
6	Charlton	30 - 46	1976	602.0	611	214	23.0	0.20
6	Charlton	46 - 76	1976	531.0	523	152	60.0	0.10
6	Charlton	76 - 107	1976	458.0	450	106	51.0	0.10
6	Charlton	107 - 137	1976	400.0	403	66	49.0	0.10

Table 6 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	Total P acid ppm	Total P ign ppm	Org-P ppm	Ext P ppm	Sol P ppm
1	Windsor	0 - 15	1977					
1	Windsor	15 - 30	1977					
1	Windsor	30 - 46	1977					
1	Windsor	46 - 76	1977					
1	Windsor	76 - 107	1977					
1	Windsor	107 - 137	1977					
2	Windsor	0 - 15	1977					
2	Windsor	15 - 30	1977					
2	Windsor	46 - 137	1977					
3	Windsor	0 - 15	1977					
3	Windsor	15 - 30	1977					
3	Windsor	46 - 137	1977					
4	Charlton	0 - 15	1977					
4	Charlton	15 - 30	1977					
4	Charlton	46 - 137	1977					
5	Charlton	0 - 15	1977					
5	Charlton	15 - 30	1977					
5	Charlton	46 - 137	1977					
6	Charlton	0 - 15	1977					
6	Charlton	15 - 30	1977					
6	Charlton	30 - 46	1977					
6	Charlton	46 - 76	1977					
6	Charlton	76 - 107	1977					
6	Charlton	107 - 137	1977		623.1	179.6		
1	Windsor	0 - 15	1978		583.0	102.5		
1	Windsor	15 - 30	1978		345.5	127.5		
1	Windsor	30 - 46	1978		339.8	21.5		
1	Windsor	46 - 76	1978		301.2	0		
1	Windsor	76 - 107	1978		364.2	29.7		
1	Windsor	107 - 137	1978		898.2	272.4		
2	Windsor	0 - 15	1978		534.1	159.2		
2	Windsor	15 - 30	1978		302.1	83.6		
2	Windsor	46 - 137	1978		765.4	280.6		
3	Windsor	0 - 15	1978		385.7	121.4		
3	Windsor	15 - 30	1978		447.8	115.3		
3	Windsor	46 - 137	1978		1062.8	356.1		
4	Charlton	0 - 15	1978		677.1	177.0		
4	Charlton	15 - 30	1978		485.5	105.2		
4	Charlton	46 - 137	1978		860.5	237.4		
5	Charlton	0 - 15	1978		577.5	172.6		
5	Charlton	15 - 30	1978		444.9	88.9		
5	Charlton	46 - 137	1978		919.5	250.5		
6	Charlton	0 - 15	1978		720.0	194.0		
6	Charlton	15 - 30	1978		571.5	183.5		
6	Charlton	30 - 46	1978		455.5	45.0		
6	Charlton	46 - 76	1978		434.0	40.5		
6	Charlton	76 - 107	1978		453.0	43.0		
6	Charlton	107 - 137	1978					

Table 7. Total and extractable Hg, Cd, Zn and Cu in soil samples from CRREL test cells.

Test Cell	Soil	Depth cm	Year Anal	Ext Hg ppm	Total Hg ppm	Ext Cd ppm	Total Cd ppm	Ext Zn ppm	Total Zn ppm	Ext Cu ppm	Total Cu ppm
	Windsor A		1975	0.0118	0.380	0.930	1.070	3.1	75	1.3	15.0
	Windsor B		1975	0.0115	0.350	0.110	0.360	1.0	35	1.0	19.0
	Windsor C		1975	0.0128	0.350	1.020	1.360	2.3	44	1.1	25.0
	Charlton A		1975	0.0120	0.340	0.880	0.910	5.0	91	3.9	30.0
	Charlton B		1975	0.0127	0.370	0.210	0.170	2.5	44	2.0	29.0
	Charlton C		1975	0.0125	0.380	0.200	0.270	1.2	40	2.0	42.0

Table 7 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	Ext Hg ppb	Total Hg ppb	Ext Cd ppb	Total Cd ppb	Ext Zn ppb	Total Zn ppb	Ext Cu ppb	Total Cu ppb
1	Windsor	0 - 15	1973								
1	Windsor	15 - 46	1973								
1	Windsor	46 - 137	1973								
2	Windsor	0 - 15	1973								
2	Windsor	15 - 46	1973								
2	Windsor	46 - 137	1973								
3	Windsor	0 - 15	1973								
3	Windsor	15 - 46	1973								
3	Windsor	46 - 137	1973								
4	Charlton	0 - 15	1973								
4	Charlton	15 - 46	1973								
4	Charlton	46 - 137	1973								
5	Charlton	0 - 15	1973								
5	Charlton	15 - 46	1973								
5	Charlton	46 - 137	1973								
6	Charlton	0 - 15	1973								
6	Charlton	15 - 46	1973								
6	Charlton	46 - 137	1973								
1	Windsor	0 - 15	1974	0.0350	0.272	0.258	0.402	23.2	76	5.0	20.8
1	Windsor	15 - 30	1974	0.0580	0.256	0.216	0.223	9.0	68	2.9	22.6
1	Windsor	30 - 46	1974	0.0760	0.288	0.065	0.173	6.1	50	2.2	22.1
1	Windsor	46 - 76	1974	0.0520	0.608	0.030	0.105	10.5	53	1.6	22.8
1	Windsor	76 - 107	1974	0.2000	0.752	0.023	0.099	3.0	47	1.6	24.1
1	Windsor	107 - 137	1974	0.0760	0.816	0.021	0.132	3.2	38	0.9	24.8
2	Windsor	0 - 15	1974	0.0320	0.624	0.196	0.148	11.2	68	5.2	23.5
2	Windsor	15 - 30	1974	0.0420	1.072	0.038	0.175	17.8	66	2.0	21.7
2	Windsor	30 - 46	1974	0.0240	0.992	0.043	0.144	5.8	64	2.2	24.5
2	Windsor	46 - 76	1974	0.0620	1.152	0.027	0.164	3.4	52	1.9	27.4
2	Windsor	76 - 107	1974	0.1440	0.997	0.026	0.194	20.2	49	1.5	24.8
2	Windsor	107 - 137	1974	0.0660	0.688	0.049	0.137	4.0	44	1.6	25.9
3	Windsor	0 - 15	1974	0.0330	0.880	0.040	0.249	9.0	76	5.0	18.9
3	Windsor	15 - 30	1974	0.0410	0.804	0.060	0.159	8.4	61	2.4	20.7
3	Windsor	30 - 46	1974	0.0580	0.848	0.069	0.116	6.7	70	2.1	24.6
3	Windsor	46 - 76	1974	0.0640	0.464	0.031	0.140	12.0	48	1.8	25.3
3	Windsor	76 - 107	1974	0.0560	0.592	0.029	0.142	12.3	47	1.4	23.5
3	Windsor	107 - 137	1974	0.0760	0.416	0.012	0.106	6.9	43	1.4	25.6
4	Charlton	0 - 15	1974	0.0180	0.656	0.331	0.404	13.6	81	8.4	36.3
4	Charlton	15 - 30	1974	0.0320	0.672	0.126	0.255	5.4	71	4.0	33.5
4	Charlton	30 - 46	1974	0.0480	0.688	0.082	0.157	6.8	76	4.0	37.6
4	Charlton	46 - 76	1974	0.0560	0.689	0.043	0.195	15.2	61	1.7	43.8
4	Charlton	76 - 107	1974	0.0820	0.879	0.026	0.152	9.2	53	1.8	42.2
4	Charlton	107 - 137	1974	0.0620	0.496	0.022	0.113	5.2	59	1.6	43.3
5	Charlton	0 - 15	1974	0.0200	0.832	0.265	0.337	15.4	74	8.1	37.6
5	Charlton	15 - 30	1974	0.0680	0.668	0.076	0.164	9.8	95	3.6	35.9
5	Charlton	30 - 46	1974	0.0380	0.752	0.064	0.126	8.1	72	3.8	36.1
5	Charlton	46 - 76	1974	0.0400	0.940	0.042	0.183	5.0	66	2.8	37.0
5	Charlton	76 - 107	1974	0.0460	0.726	0.027	0.096	3.9	60	1.8	48.6
5	Charlton	107 - 137	1974	0.0640	1.264	0.020	0.116	10.0	58	2.0	42.4
6	Charlton	0 - 15	1974	0.0280	0.918	0.266	0.420	15.6	84	9.7	40.7
6	Charlton	15 - 30	1974	0.1040	0.672	0.184	0.322	7.0	72	4.4	41.6
6	Charlton	30 - 46	1974	0.0480	0.704	0.196	0.221	16.0	67	3.0	37.3
6	Charlton	46 - 76	1974	0.0420	0.928	0.069	0.146	5.1	60	2.5	39.9
6	Charlton	76 - 107	1974	0.0940	0.694	0.046	0.115	2.6	69	1.8	42.4
6	Charlton	107 - 137	1974	0.0500	1.536	0.043	0.113	6.9	56	1.9	46.1
1	Windsor	0 - 15	1975	0.0165	4.120	1.480	2.680	29.9	92	24.8	54.0
1	Windsor	15 - 30	1975	0.0152	1.470	1.250	2.360	8.4	43	8.5	28.0
1	Windsor	30 - 46	1975	0.0115	0.630	1.180	1.820	3.6	40	3.6	28.0
1	Windsor	46 - 76	1975	0.0132	0.550	1.020	1.630	3.0	30	3.4	31.0
1	Windsor	76 - 107	1975	0.0129	0.410	0.680	1.410	2.9	29	2.7	23.0
1	Windsor	107 - 137	1975	0.0125	0.340	0.450	0.820	1.3	46	1.1	19.0
2	Windsor	0 - 15	1975	0.0180	7.880	1.330	2.720	50.1	95	41.1	78.0
2	Windsor	15 - 30	1975	0.0150	1.690	0.480	2.130	11.9	52	9.0	25.0
2	Windsor	30 - 46	1975	0.0240	1.150	0.450	1.450	3.6	31	2.9	16.0
2	Windsor	46 - 76	1975	0.0162	0.610	0.740	0.990	2.0	27	2.1	20.0
2	Windsor	76 - 107	1975	0.0182	0.370	0.280	0.230	1.4	44	1.3	20.0
2	Windsor	107 - 137	1975	0.0148	0.370	0.260	1.880	1.1	41	1.0	19.0
3	Windsor	0 - 15	1975	0.0095	3.300	1.310	2.540	22.1	63	16.8	37.0
3	Windsor	15 - 30	1975	0.0102	0.700	0.870	1.130	2.4	29	2.6	16.0
3	Windsor	30 - 46	1975	0.0097	0.460	0.590	0.560	1.6	36	1.8	19.0
3	Windsor	46 - 76	1975	0.0090	0.410	0.460	0.530	1.9	29	1.6	18.0

Table 7 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	Ext Hg ppm	Total Hg ppm	Ext Cd ppm	Total Cd ppm	Ext Zn ppm	Total Zn ppm	Ext Cu ppm	Total Cu ppm
3	Windsor	76 - 107	1975	0.0055	0.320	1.020	1.260	1.5	23	1.3	20.0
3	Windsor	107 - 137	1975	0.0063	0.340	0.540	0.680	1.4	19	1.2	16.0
4	Charlton	0 - 15	1975	0.0264	6.200	1.370	2.720	43.3	102	38.3	84.0
4	Charlton	15 - 30	1975	0.0175	1.650	1.190	2.220	8.8	51	11.0	39.0
4	Charlton	30 - 46	1975	0.0284	0.780	0.950	1.410	3.5	42	5.0	36.0
4	Charlton	46 - 76	1975	0.0290	0.370	0.320	0.690	1.2	33	1.9	33.0
4	Charlton	76 - 107	1975	0.0138	0.440	0.780	0.360	1.8	31	2.5	37.0
4	Charlton	107 - 137	1975	0.0130	0.370	0.290	0.420	1.7	33	1.9	32.0
5	Charlton	0 - 15	1975	0.0713	8.340	7.650	21.730	59.0	117	51.1	98.0
5	Charlton	15 - 30	1975	0.0336	1.780	6.710	10.430	14.1	57	11.3	41.0
5	Charlton	30 - 46	1975	0.0132	0.670	1.650	1.030	7.7	46	6.7	30.0
5	Charlton	46 - 76	1975	0.0130	0.480	1.140	0.650	3.3	31	3.4	30.0
5	Charlton	76 - 107	1975	0.0129	0.390	0.710	0.380	1.9	37	1.7	34.0
5	Charlton	107 - 137	1975	0.0130	0.380	0.940	0.610	2.3	37	1.8	37.0
6	Charlton	0 - 15	1975	0.0672	4.300	1.470	2.470	33.2	79	20.5	59.0
6	Charlton	15 - 30	1975	0.0310	0.820	0.760	1.830	4.8	50	5.6	33.0
6	Charlton	30 - 46	1975	0.0280	0.530	0.670	1.840	2.2	41	3.0	27.0
6	Charlton	46 - 76	1975	0.0140	0.420	0.590	0.850	1.2	37	1.9	31.0
6	Charlton	76 - 107	1975	0.0137	0.380	0.490	0.590	1.1	33	1.4	36.0
6	Charlton	107 - 137	1975	0.0165	0.390	0.520	0.610	1.1	34	1.7	37.0
1	Windsor	0 - 15	1976								
1	Windsor	15 - 30	1976								
1	Windsor	30 - 46	1976								
1	Windsor	46 - 76	1976								
1	Windsor	76 - 107	1976								
1	Windsor	107 - 137	1976								
2	Windsor	0 - 15	1976								
2	Windsor	15 - 30	1976								
2	Windsor	30 - 46	1976								
2	Windsor	46 - 76	1976								
2	Windsor	76 - 107	1976								
2	Windsor	107 - 137	1976								
3	Windsor	0 - 15	1976								
3	Windsor	15 - 30	1976								
3	Windsor	30 - 46	1976								
3	Windsor	46 - 76	1976								
3	Windsor	76 - 107	1976								
3	Windsor	107 - 137	1976								
4	Charlton	0 - 15	1976								
4	Charlton	15 - 30	1976								
4	Charlton	30 - 46	1976								
4	Charlton	46 - 76	1976								
4	Charlton	76 - 107	1976								
4	Charlton	107 - 137	1976								
5	Charlton	0 - 15	1976								
5	Charlton	15 - 30	1976								
5	Charlton	30 - 46	1976								
5	Charlton	46 - 76	1976								
5	Charlton	76 - 107	1976								
5	Charlton	107 - 137	1976								
6	Charlton	0 - 15	1976								
6	Charlton	15 - 30	1976								
6	Charlton	30 - 46	1976								
6	Charlton	46 - 76	1976								
6	Charlton	76 - 107	1976								
6	Charlton	107 - 137	1976								
1	Windsor	0 - 15	1977			14.900	16.500	16.3	68	13.8	33.8
1	Windsor	15 - 30	1977			0.800	1.900	1.1	45	1.3	16.3
1	Windsor	30 - 46	1977			0.200	0.200	0.3	41	0.7	15.5
1	Windsor	46 - 76	1977			0.100	0.200	0.1	30	0.2	17.1
1	Windsor	76 - 107	1977				0.000		36		18.6
1	Windsor	107 - 137	1977				0.000	0.1	33	0.1	17.2
2	Windsor	0 - 15	1977			35.400	45.600	40.5	101	30.3	71.8
2	Windsor	15 - 30	1977			18.300	20.300	19.4	79	6.9	40.4
2	Windsor	46 - 137	1977			4.200	0.400	4.7	39	4.6	23.8
3	Windsor	0 - 15	1977			20.000	25.500	18.8	81	17.6	53.0
3	Windsor	15 - 30	1977			2.200	3.400	2.3	54	3.4	23.7
3	Windsor	46 - 137	1977			0.100	0.000	0.1	36	0.2	22.7

Table 7 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	Ext Hg ppm	Total Hg ppm	Ext Cd ppm	Total Cd ppm	Ext Zn ppm	Total Zn ppm	Ext Cu ppm	Total Cu ppm
4	Charlton	0 - 15	1977			33.100	44.300	32.8	136	27.6	93.0
4	Charlton	15 - 30	1977			4.000	9.100	3.0	73	6.8	44.6
4	Charlton	46 - 137	1977			0.400	0.800	0.6	47	1.3	35.5
5	Charlton	0 - 15	1977			21.300	29.900	22.3	118	18.6	86.8
5	Charlton	15 - 30	1977			0.500	1.100	0.4	54	0.9	38.7
5	Charlton	46 - 137	1977			0.200	0.500	0.3	54	0.6	38.7
6	Charlton	0 - 15	1977			25.800	26.500	34.1	103	24.7	68.6
6	Charlton	15 - 30	1977			1.400	2.400	2.7	62	3.9	35.9
6	Charlton	30 - 46	1977			0.400	0.700	0.9	70	2.0	38.6
6	Charlton	46 - 76	1977			0.100	1.100	0.8	51	1.0	37.3
6	Charlton	76 - 107	1977			0.100	0.400	0.3	52	0.8	35.2
6	Charlton	107 - 137	1977			0.200	0.200	0.4	48	0.9	37.7
1	Windsor	0 - 15	1978			6.100	8.500	8.8	64	9.1	28.7
1	Windsor	15 - 30	1978			0.800	1.300	2.2	50	2.3	18.6
1	Windsor	30 - 46	1978			0.100	0.200	0.6	47	0.7	17.1
1	Windsor	46 - 76	1978				0.200	0.7	32	0.4	17.2
1	Windsor	76 - 107	1978				0.200	0.3	37	0.4	18.7
1	Windsor	107 - 137	1978				0.200	0.4	33	0.5	17.0
2	Windsor	0 - 15	1978			26.500	36.300	26.6	99	28.8	101.3
2	Windsor	15 - 30	1978			0.400	10.200	3.8	51	4.3	20.0
2	Windsor	46 - 137	1978			0.400	0.900	0.4	35	0.8	18.3
3	Windsor	0 - 15	1978			7.800	13.600	7.8	69	9.3	40.7
3	Windsor	15 - 30	1978			0.200	0.600	1.0	43	1.0	16.6
3	Windsor	46 - 137	1978					0.0	30	0.5	19.7
4	Charlton	0 - 15	1978			20.700	14.600	15.3	103	22.6	68.9
4	Charlton	15 - 30	1978			3.500	1.400	1.7	46	5.9	32.1
4	Charlton	46 - 137	1978			0.700	0.600	1.1	90	1.4	35.3
5	Charlton	0 - 15	1978			19.600	11.800	18.8	101	20.7	64.9
5	Charlton	15 - 30	1978			2.400	5.000	3.1	66	4.6	42.3
5	Charlton	46 - 137	1978			0.200		0.4	38	0.6	32.0
6	Charlton	0 - 15	1978			10.700	8.100	14.5	56	14.4	42.4
6	Charlton	15 - 30	1978			1.000	1.300	4.3	53	3.2	27.3
6	Charlton	30 - 46	1978			0.500	0.200	1.1	50	2.8	28.2
6	Charlton	46 - 76	1978			0.200		0.8	45	1.1	25.1
6	Charlton	76 - 107	1978			0.100		0.3	42	0.8	28.7
6	Charlton	107 - 137	1978					0.1	43	0.4	31.3

Table 8. Total and extractable Ni, Cr, and Pb in soil samples from CRREL test cells.

Test Cell	Soil	Depth cm	Year Anal	Ext Ni ppm	Total Ni ppm	Ext Cr ppm	Total Cr ppm	Ext Pb ppm	Total Pb ppm
	Windsor A		1975	0.57	11.6	0.18	12.7	1.21	12.8
	Windsor B		1975	0.39	59.2	0.21	18.2	1.29	8.3
	Windsor C		1975	0.43	63.2	0.23	20.1	1.12	7.2
	Charlton A		1975	1.35	27.7	0.44	25.5	2.17	21.1
	Charlton B		1975	0.80	29.2	0.51	30.4	1.35	10.5
	Charlton C		1975	0.57	47.5	0.39	33.9	0.88	8.8
1	Windsor	0 - 15	1973						
1	Windsor	15 - 46	1973						
1	Windsor	46 - 137	1973						
2	Windsor	0 - 15	1973						
2	Windsor	15 - 46	1973						
2	Windsor	46 - 137	1973						
3	Windsor	0 - 15	1973						
3	Windsor	15 - 46	1973						
3	Windsor	46 - 137	1973						
4	Charlton	0 - 15	1973						
4	Charlton	15 - 46	1973						
4	Charlton	46 - 137	1973						

Table 8 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	Ext Ni ppm	Total Ni ppm	Ext Cr ppm	Total Cr ppm	Ext Pb ppm	Total Pb ppm
5	Charlton	0 - 15	1973						
5	Charlton	15 - 46	1973						
5	Charlton	46 - 137	1973						
6	Charlton	0 - 15	1973						
6	Charlton	15 - 46	1973						
6	Charlton	46 - 137	1973						
1	Windsor	0 - 15	1974	4.56	15.3	6.56	35.0	1.96	39.0
1	Windsor	15 - 30	1974	2.95	19.1	7.00	34.0	2.08	41.0
1	Windsor	30 - 46	1974	2.40	16.8	5.65	30.0	2.24	45.0
1	Windsor	46 - 76	1974	1.81	14.2	5.23	27.0	1.36	27.0
1	Windsor	76 - 107	1974	1.76	12.1	4.97	29.0	1.17	23.0
1	Windsor	107 - 137	1974	2.09	8.3	6.20	23.0	0.92	18.0
2	Windsor	0 - 15	1974	2.15	12.6	5.63	31.0	2.31	46.0
2	Windsor	15 - 30	1974	2.11	13.9	4.68	29.0	1.68	34.0
2	Windsor	30 - 46	1974	1.69	12.8	4.92	27.0	1.67	33.0
2	Windsor	46 - 76	1974	1.56	13.0	5.37	29.0	1.29	26.0
2	Windsor	76 - 107	1974	1.22	17.1	4.89	26.0	1.33	27.0
2	Windsor	107 - 137	1974	1.37	22.2	4.74	27.0	1.32	26.0
3	Windsor	0 - 15	1974	2.35	21.5	5.03	52.0	2.06	41.0
3	Windsor	15 - 30	1974	1.50	25.0	4.44	32.0	2.00	40.0
3	Windsor	30 - 46	1974	1.33	17.3	4.96	29.0	1.80	36.0
3	Windsor	46 - 76	1974	1.38	22.8	4.73	32.0	1.30	26.0
3	Windsor	76 - 107	1974	1.07	15.9	4.54	28.0	1.17	23.0
3	Windsor	107 - 137	1974	1.11	19.2	4.55	29.0	1.21	24.0
4	Charlton	0 - 15	1974	2.29	26.1	5.06	56.0	2.82	56.0
4	Charlton	15 - 30	1974	2.25	33.4	4.66	53.0	2.80	56.0
4	Charlton	30 - 46	1974	2.34	30.5	4.75	60.0	2.47	49.0
4	Charlton	46 - 76	1974	1.49	34.1	4.58	55.0	1.60	32.0
4	Charlton	76 - 107	1974	1.52	32.6	4.33	54.0	1.62	32.0
4	Charlton	107 - 137	1974	1.40	29.7	4.31	53.0	1.70	34.0
5	Charlton	0 - 15	1974	2.66	23.4	4.96	51.0	3.10	62.0
5	Charlton	15 - 30	1974	2.20	28.1	5.03	52.0	2.82	56.0
5	Charlton	30 - 46	1974	2.87	27.7	4.57	50.0	2.69	54.0
5	Charlton	46 - 76	1974	2.03	27.2	4.33	48.0	2.47	49.0
5	Charlton	76 - 107	1974	1.46	35.9	4.50	53.0	1.59	32.0
5	Charlton	107 - 137	1974	1.39	26.7	4.47	49.0	1.70	34.0
6	Charlton	0 - 15	1974	2.98	31.3	5.33	85.0	1.60	32.0
6	Charlton	15 - 30	1974	2.33	24.2	5.11	56.0	1.67	33.0
6	Charlton	30 - 46	1974	2.57	25.8	5.25	53.0	1.65	31.0
6	Charlton	46 - 76	1974	1.95	25.7	4.75	52.0	2.20	40.0
6	Charlton	76 - 107	1974	1.70	28.3	4.60	51.0	1.89	38.0
6	Charlton	107 - 137	1974	3.36	27.5	6.65	49.0	1.68	34.0
1	Windsor	0 - 15	1975	20.19	37.2	2.37	33.8	1.75	17.2
1	Windsor	15 - 30	1975	10.80	36.7	1.08	23.2	2.42	10.0
1	Windsor	30 - 46	1975	4.97	34.6	0.78	19.6	1.88	8.9
1	Windsor	46 - 76	1975	7.67	23.2	0.90	14.5	1.87	7.8
1	Windsor	76 - 107	1975	2.84	19.1	0.39	12.7	1.59	7.5
1	Windsor	107 - 137	1975	1.25	27.5	0.18	14.1	1.16	6.9
2	Windsor	0 - 15	1975	16.47	193.6	3.56	42.9	2.63	25.0
2	Windsor	15 - 30	1975	7.39	29.8	1.17	25.1	2.15	12.8
2	Windsor	30 - 46	1975	2.50	14.8	0.73	16.4	1.29	8.6
2	Windsor	46 - 76	1975	2.44	18.3	0.48	16.3	1.10	7.9
2	Windsor	76 - 107	1975	1.25	31.7	0.31	21.8	0.88	6.7
2	Windsor	107 - 137	1975	1.62	14.5	0.18	10.9	0.71	8.2
3	Windsor	0 - 15	1975	10.23	18.8	1.86	27.3	1.68	12.4
3	Windsor	15 - 30	1975	3.18	12.8	0.69	14.5	1.14	8.0
3	Windsor	30 - 46	1975	2.33	13.6	0.39	14.8	1.17	6.9
3	Windsor	46 - 76	1975	1.33	13.1	0.30	14.9	0.86	8.1
3	Windsor	76 - 107	1975	0.80	22.3	0.21	13.8	0.81	6.9
3	Windsor	107 - 137	1975	0.73	11.4	0.16	10.8	0.75	5.8
4	Charlton	0 - 15	1975	16.53	61.6	3.18	57.1	1.92	24.3
4	Charlton	15 - 30	1975	7.39	29.9	1.21	35.7	1.36	13.2
4	Charlton	30 - 46	1975	2.61	23.7	0.76	28.6	2.03	11.6
4	Charlton	46 - 76	1975	1.53	23.3	0.32	25.1	1.11	8.2
4	Charlton	76 - 107	1975	2.22	30.0	0.31	26.8	1.10	9.1
4	Charlton	107 - 137	1975	2.10	27.4	0.32	26.6	1.43	10.3
5	Charlton	0 - 15	1975	30.41	172.8	3.59	62.5	1.30	32.7
5	Charlton	15 - 30	1975	7.10	30.8	1.07	35.7	2.26	17.4
5	Charlton	30 - 46	1975	4.26	34.0	0.94	30.4	1.96	12.5

Table 8 (cont'd.)

Test Cell	Soil	Depth cm	Year Anal	Ext Ni ppm	Total Ni ppm	Ext Cr ppm	Total Cr ppm	Ext Pb ppm	Total Pb ppm
5	Charlton	46 - 76	1975	1.82	31.1	0.72	25.5	1.07	9.2
5	Charlton	76 - 107	1975	1.65	28.8	0.27	25.8	0.63	11.9
5	Charlton	107 - 137	1975	1.65	34.4	0.30	28.6	0.65	9.7
6	Charlton	0 - 15	1975	12.50	45.8	1.74	46.4	2.45	21.5
6	Charlton	15 - 30	1975	6.25	46.5	0.67	39.3	1.48	16.7
6	Charlton	30 - 46	1975	3.41	55.6	0.54	38.8	1.22	12.8
6	Charlton	46 - 76	1975	4.55	35.2	0.41	26.8	0.91	10.0
6	Charlton	76 - 107	1975	1.89	62.0	0.23	32.1	0.39	8.9
6	Charlton	107 - 137	1975	1.81	66.9	0.25	31.9	0.61	9.2

Table 9. Explanation of meteorological parameters

Parameter	Explanation
Station Pressure	Atmospheric pressure taken hourly.
Precipitation	Amount of liquid precipitation, hourly total.
Dry bulb Temperature	Ambient temperature, taken hourly.
Relative Humidity	Relative humidity, taken hourly.
Snow depth*	Amount of snow accumulation
Wind speed Wind direction	Wind speed and direction measured at 4 m above surface evaluated for an hourly average, peak gusts with time and direction on a daily and monthly basis, and a prevailing wind direction for the day.
Vertical Eppley	Total incoming solar radiation falling on a horizontal plane. Evaluated for an hourly average.
Inverted Eppley radiation	Reflected incoming solar radiation falling on a horizontal plane. Evaluated for an hourly average.
Evaporation	Total amount daily measurements made with an X-3 pan.

* Snow Depth is measured by the observer when site is visited.

ALL METEOROLOGICAL PARAMETERS ARE TABULATED ON THE 24-HOUR CLOCK, LOCAL STANDARD TIME

TABLE 10

Air Temperature (^{o}F)* October 1972 to May 1978

MONTH	1972	1973	1974	1975	1976	1977	1978	Average Temp. (°F)
January		21	20	21	10	9	16	16.2
February		17	18	21	26	10	12	19.0
March		38	30	28	32	36	27	31.8
April		44	45	38	48	43	39	42.8
May		52	55	60	53	57	58	55.8
June		65	63	63	68	61		64.0
July		67	69	71	66	67		68.0
August		70	68	67	65	65		67.0
September		56	58	56	55	57		56.4
October	42	47	42	49	44	45		44.8
November	32	34	35	41	31	39		35.3
December	20	25	27	19	16	24		21.8
Annual		44.7	44.2	44.5	42.8	43.6		43.6 5 or 6 year average

* To convert from °F to °C use the equation:
°C = 5/9 (°F-32)

TABLE 11

Precipitation (in.), CRREL,

October 1972 - May 1978

MONTH	1972	1973	1974	1975	1976	1977	1978	Average Precip.
January		2.58	2.06	2.75	3.09	1.75	4.32	2.76
February		1.46	2.04	1.71	3.42	1.95	0.77	1.89
March		1.78	2.51	1.72	2.34	4.05	2.09	2.42
April		3.79	1.69	2.17	3.03	3.25	1.19	2.52
May		5.23	3.21	0.92	5.64	1.55	1.69	3.40
June		6.44	2.58	3.16	4.29	5.50		4.39
July		1.74	2.37	4.60	5.12	0.97		2.96
August		2.75	3.38	3.99	4.38	1.87		3.27
September		2.18	5.07	3.62	3.18	4.20		3.65
October	2.91	2.39*	1.15	5.60	5.82	5.59		4.21
November	4.18	2.59	3.13	4.23	1.58	2.88		3.10
December	4.58	6.70	1.74	2.60	1.78	2.68		3.35
Total		39.63	30.93	37.07	43.67	36.24		37.51 (yearly average total 5 yrs.)

* Missing Data

Table 12. Wind speed (mph) and direction, CRREL, October 1972–May 1978.

MONTH	1972	1973	1974	1975	1976	1977	1978	Avg. Vel.
January		4 WNW&NE	3 NNE&SSW	2 W	1 VAR	5 MISSING	4 SSE	3.3 N&SE
February		5 NNW	5 NW	3 N	5 SSW	5 N&SW	3 VAR	4.3 NNW
March		4 SW&NE	7 NE&S	4 NNW	6 VAR	4 VAR&NE	3 VAR	4.7 W&NE
April		4 N&SE	5 SSW&NW	4 NNW	5 NW	3 S	3 VAR	4.0 NW
May		2 WNW&SE	5 VAR&NNW	3 SE	5 VAR	5 VAR	2 VAR	3.7 NW
June		3 NW&SE	3 VAR	2 S	4 VAR	4 S		3.2 VAR
July		4 W&SE	4 SSW	1 S	4 VAR	3 W		3.2 S
August		5 SW	1 VAR	3 NNW	4 SSW	3 VAR&SW		3.2 SW
September		5 SW	1 S	3 N&S	4 VAR	3 VAR		3.2 VAR
October	3 WNW&SW	4 W	2 NNW	4 N	4 VAR	4 VAR		3.5 NW
November	4 W&NE	4 WSW&S	3 N	5 NE	4 MISSING	4 VAR		4.0 NNE
December	3 NE&W	5 NNW&SSW	2 NNW	4 NW	3 miSSINg	4 VAR		3.5 NW

Average wind velocity for period = 3.7 mph
Average wind direction for period = NW and S

TABLE 13
Incoming solar radiation (Langley/Day), CRREL
January 1974 - May 1978

MONTH	1974	1975	1976	1977	1978	AVERAGE
January	113(1)	133	129	149	130	131
February	238(2)	200	190	181	257	213
March	283	285	298	290	338	299
April	406	386	376	432	383	397
May	251(3)	446	398	539	471	421
June	514	453	503	420		472
July	498	512	456	531		499
August	443	396(4)	383(5)	421		411
September	311	271	297(6)	249		282
October	240	192	179	208		205
November	130	136	133	121		130
December	85	95	123	114		104
						Avg.Daily 297.0
Yearly Average	301	292	289	305		

(1) Data for 17 days, equipment failure
(2) Data for 15 days, equipment failure
(3) Data for 10 days, equipment failure
(4) Data for 11 days, equipment failure
(5) Data for 26 days, equipment failure
(6) Data for 18 days, equipment failure

TABLE 14
MONTHLY EVAPORATION (mm) CRREL, April 1975 - October 1977

Month	1975	1976	1977
April	18.7 (4/26-4/30)	26.6 (4/23-4/30)	
May	163.6	92.2	144.9
June	128.4	123.3	104.8
July	147.0	112.2	144.7
August	130.1	86.1	78.7
September	74.8	53.3	62.5
October	66.9	26.4	42.6
November	55.5		
TOTAL	710.8	493.5	578.2

Appendix A

The following tables contain daily meteorological summary for the Hanover, N.H., area organized by month extending from April 1974 to April 1978.

Table A1 Monthly Meteorological Summary

April 1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	46	28	37	100	43	65	26	7	NW	13		
2	37	28	32	100	73	97	31	2	SW	4	0.13	
3	71	31	51	100	29	65	40	4	S	10	0.01	
4	67	47	57	100	65	90	54	4	S	8		
5	57	35	46	100	84	99	46	3	S	8	0.21	
6	37	29	33	100	57	77	32	6	NW	10		
7	40	21	30	95	41	66	20	8	S	19	0.19	
8	56	29	42	100	34	53	26	7	N	10		
9	27	21	24	100	65	95	23	7	N	10	0.54	
10	29	20	24	100	58	75	17	8	NW	16		
11	54	15	34	100	37	71	26	4	Var	13		
12	48	27	38	100	53	77	32	4	Var	8	0.03	
13	43	40	42	100	88	94	40	5	SSE	8		
14	71	38	54	100	48	84	49	5	SSW	10	0.08	
15	53	44	48	100	52	69	38	7	SSW	13	0.10	
16	50	31	40	99	38	58	26	7	NNW	14		
17	66	28	47	100	23	56	32	4	Var	10		
18	64	33	48	100	36	66	37	5	Var	15		
19	52	29	40	100	26	53	24	6	Var	10		
20	59	25	42	100	21	54	27	3	NW	6		
21	78	28	53	100	24	54	37	4	SW	7		
22	80	48	64	100	39	67	53	6	SSW	13	0.01	
23	55	47	51	100	58	85	47	3	SSW	6		
24	47	37	42	100	75	91	40	7	N	15	0.31	
25	58	31	44	100	30	63	32	5	N	11		
26	55	36	46	100	40	71	37	6	NNW	17		
27	73	30	52	100	29	68	42	3	Var	8		
28	84	39	62	100	32	61	48	5	SSW	11		
29	78	56	67	100	47	66	55	5	SSW	8	0.05	
30	79	54	66	100	32	64	54	4	S	10	0.03	
Avg.Monthly	57	34	45	100	21	72	36	5	SSW & NW	19	1.69 Total	

Monthly Max = 84°F
Monthly Min = 15°F
Peak Gust = 40 MPH on 7 April

Table A2 Monthly Meteorological Summary

May 1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	67	39	53	100	36	60	40	10	NNW	18	0.34	
2	59	33	41	99	23	44	21	7	NNW	10		
3	58	30	44	99	37	84	40	2	Var	5	0.29	
4	53	28	40	99	31	66	27	8	NW	16	0.01	
5	57	25	41	98	25	59	28	4	Var	8		
6	51	30	40	97	36	75	33	5	SE	12	0.10	
7	50	36	43	97	43	73	35	4	Var	8	0.06	
8	58	35	46	98	38	69	37	3	Var	7		
9	66	41	54	96	38	69	44	7	SE	15		
10	49	46	48	100	88	99	48	3	Var	8	0.53	
11	62	47	54	100	47	76	47	3	Var	7		
12	52	49	50	100	76	93	48	7	SE	11	0.77	
13	58	45	52	100	54	73	44	5	SSW	8	0.01	
14	77	41	59	99	34	57	43	7	S	13		
15	91	49	70	99	25	57	54	7	S	16		
16	78	48	63	100	32	57	43	4	NW	10		
17	80	49	65	98	45	74	57	5	Var	14	0.08	
18	71	43	57	98	34	60	44	10	NNW	11		
19	63	37	50	95	30	53	34	5	NNW	14		
20	65	35	50	96	30	54	34	4	NNW	8		
21	70	37	54	97	30	66	43	2	Var	6		
22	83	55	69	100	44	71	59	4	Var	11		
23	57	47	52	100	86	98	52	4	SSE	9	0.29	
24	54	47	51	100	83	97	50	4	SE	11	0.23	
25	61	48	55	99	48	89	52	6	Var	13	0.04	
26	49	45	47	98	81	94	46	2	Var	6	0.25	
27	55	45	50	100	64	79	44	3	Var	7		
28	63	45	54	100	44	83	49	3	Var	15		
29	52	44	48	100	81	98	48	2	Var	5	0.04	
30	66	49	58	100	49	82	48	3	Var	9		
31	67	49	58	100	47	77	46	6	N	12		
Avg.	62	42	55	100	23	74	43	5	Var.& NNW	18	3.04 Total	

Monthly Max = 91°F
Monthly Min = 25°F
Peak Gust = 42 MPH on 1 May.

Table A3 Monthly Meteorological Summary

June 1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	72	52	62	100	33	74	54	4	NNW	11	.07	
2	72	43	58	100	34	71	49	1	Var	4		
3	77	43	60	100	28	80	54	2	S	10		
4	79	49	64	100	29	72	55	2	SSW	4		
5	87	49	68	100	31	67	57	4	S	11		
6	76	56	66	99	44	69	56	5	Var	15		
7	76	43	59	98	27	59	45	4	Var	10		
8	85	38	62	98	44	70	52	3	Var	7		
9	88	56	72	100	45	78	65	3	Var	7		
10	92	64	78	100	49	78	71	5	SSE	10	.38	
11	80	52	66	100	49	76	58	4	ESE	12	.14	
12	79	45	62	100	40	75	54	4	S	9	.09	
13	73	45	59	100	31	67	48	4	S	10		
14	72	48	60	100	37	85	56	3	Var	8	.32	
15	77	50	64	100	37	72	55	3	SE	13		
16	62	59	61	100	86	91	58	3	SSE	7	.11	
17	78	62	70	100	64	84	65	3	SSE	9	.30	
18	76	52	64	100	33	72	55	2	Var	7		
19	75	49	62	100	47	74	54	3	S	9		
20	79	58	69	100	42	75	61	4	SSW	9	.04	
21	68	54	61	99	65	89	58	2	Var	4	.09	
22	73	55	64	98	50	79	58	3	Var	10	.25	
23	71	51	61	100	40	77	54	4	N	8		
24	75	49	62	100	48	87	58	4	N	8	.06	
25	68	55	62	100	52	84	57	4	N	11	.09	
26	58	54	56	100	91	99	56	2	Var	5	.12	
27	66	53	59	100	60	87	55	2	Var	5	.04	
28	72	51	62	100	38	70	52	5	SE	11		
29	70	55	63	100	65	85	59	4	SE	8	.48	
30	77	57	67	100	46	73	58	5	S	10		
Avg.	75	53	63	100	27	77	56	3	Var	15	2.58 Total	

Monthly Max = 92°F
Monthly Min = 38°F
Peak Gust = 21 MPH on 6 June.

Table A4 Monthly Meteorological Summary

July 1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	78	53	66	100	42	76	58	5	SSW	19	.01	
2	78	50	64	100	52	88	60	3	S	8	.03	
3	81	64	73	100	62	81	67	4	SSW	10	.12	
4	89	66	78	100	53	82	72	5	SSW	13	.16	
5	69	64	67	100	86	92	65	3	SE	7	.04	
6	77	57	67	99	41	71	57	4	NNW	10		
7	81	56	69	99	53	81	63	3	NNW	7	.02	
8	83	61	72	100	57	87	68	2	NNW	4	.26	
9	87	65	76	100	52	75	68	4	S	16		
10	79	55	67	100	46	71	57	6	NNW	12		
11	69	52	61	100	49	75	53	7	NNW	15		
12	76	50	63	100	40	70	53	4	NNW	15	.10	
13	87	56	72	99	31	70	62	3	S	8	.10	
14	91	62	77	100	46	75	69	3	SSW	7	.42	
15	82	64	73	100	65	97	72	3	SSW	8	.42	
16	76	56	66	100	45	80	60	2	NNE	5		
17	78	46	62	100	34	73	54	3	SSE	8		
18	85	58	72	100	41	75	64	4	SSW	12		
19	80	67	74	100	53	89	71	5	SSW	9	.43	
20	72	54	63	100	39	69	53	7	NNW	15		
21	78	46	62	100	44	79	56	3	SSE	7		
22	82	50	66	100	42	80	60	3	NNE	5		
23	80	56	68	100	52	89	65	3	S	11		
24	73	61	67	100	48	81	61	7	ESE	10		
25	77	58	68	100	43	77	61	2	S	6		
26	76	53	65	100	55	83	60	2	SE	6		
27	73	62	68	100	74	91	65	1	SSW	4		
28	82	64	73	100	68	91	70	3	SE	8	.02	
29	81	68	75	100	59	90	72	4	SSE	11	.14	
30	76	63	70	99	81	91	67	3	SSE	5	.10	
31	81	58	70	100	44	87	66	2	SSW	7		
Avg.	79	56	69	100	31	84	63	4	SSW	16	2.37 Total	

Monthly Max = 91°F
Monthly Min = 46°F
Peak Gust = 37 MPH on 19 July

Table A5 Monthly Meteorological Summary

August 1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	79	54	67	100	54	79	60	2	SSW	5		
2	84	63	74	100	48	80	68	1	SSW	3		
3	85	63	74	100	57	86	70	2[1]	S	4[1]	.95	
4	86	68	77	100	56	89	74	M	M	M	.08	
5	77	58	68	100	55	80	62	2[2]	SSW	5		
6	81	54	68	100	41	79	61	1	NNW	4		
7	80	54	67	100	46	82	61	1	S	2	.15	
8	84	54	69	100	51	83	64	1	NNW	6		
9	68	56	62	100	72	94	60	1	N	3		
10	77	53	65	100	46	82	60	1	N	3		
11	82	50	66	100	40	79	59		Calm	2		
12	87	52	70	100	41	76	62		Calm	2		
13	87	54	72	100	35	78	65		Calm	2		
14	79	57	68	100	51	79	61	2	NNW	10		
15	75	52	64	100	34	75	56	2	NNW	8		
16	83	44	64	100	38	76	56		Calm	1		
17	78	50	64	100	73	95	63	1	SSW	5	.60	
18	82	60	71	100	52	86	67		Calm	2		
19	84	55	70	100	42	84	65		Calm[3]	1		
20	84	56	70	100	41	80	64		Calm[4]	1		
21	87	55	71	100	51	85	66		Calm	1		
22	88	58	73	100	35	76	65	1	S	3		
23	78	58	68	100	82	97	67		Calm	2	.03	
24	83	64	74	100	56	80	68	2	S	8	.04	
25	76	52	64	100	38	73	55	2	N	8		
26	76	50	63	100	56	78	56	2	SSE	7		
27	81	60	71	100	69	92	69	3	S	12	.08	
28	75	58	67	100	62	88	63	1	N	5	.04	
29	63	59	61	100	97	100	61	1	S	2	1.27	
30	69	59	64	100	97	100	64		Calm	1	.14	
31	77	57	67	100	58	89	64	1	SSE	3		
Avg.	80	56	68	100	34	81	63	1	Var[5]	12	3.38 Total	

Monthly Max = 88°F
Monthly Min = 44°F
Peak Gust = 24 MPH on 14 August

[1] Wind data for first 13 hrs. of day only.
[2] Wind data for last 15 hrs. of day only.
[3] Wind data for 20 hrs. only.
[4] Wind data for 22 hrs. only.
[5] The monthly wind avg. is taken from 26 complete days only.

Table A6 Monthly Meteorological Summary

September 1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	74	58	66	100	38	75	58	1	NW	3	.14	
2	62	55	59	100	89	98	59		Calm	1	.20	
3	56	55	56	100	100	100	56	1	NE	2	1.24	
4	60	46	53	100	76	96	52	1	NNW	4	.12	
5	70	43	57	100	45	86	58		Calm	2		
6	66	43	55	100	68	93	53	1	N	1		
7	73	51	62	100	56	87	58		Calm	1	T	
8	76	53	65	100	54	89	62	1	S	4		
9	78	55	67	100	57	87	63	1	SSW	4		
10	78	53	66	100	68	92	64		Calm	Calm		
11	78	59	69	100	62	90	66	1	S	6		
12	80	57	69	100	69	89	66	1	S	3	.02	
13	81	67	74	100	62	90	71	2	S	8	.78	
14	68	45	57	99	54	79	51	1	NNW	5		
15	68	47	58	100	49	83	53	2	S	8		
16	66	44	55	100	47	74	47	1	NNW	6		
17	70	40	55	100	52	84	51	2	S	8	.05	
18	64	42	53	100	51	85	49	2	NE	4		
19	70	39	55	100	72	93	53	1	S	6		
20	75	59	67	100	76	95	66	1	S	6	.13	
21	63	51	57	100	96	100	57	1	N	4	1.08	
22	63	43	53	100	52	83	48	1	NNW	6		
23	53	35	44	100	50	75	37	2	NNW	8		
24	55	24	40	100	39	80	34	1	NE	3		
25	54	32	43	100	67	94	42	1	SSW	2	.10	
26	64	45	55	100	55	88	52		Calm	1		
27	76	44	60	100	55	88	57	1	S	4		
28	65	50	58	100	100	100	58		Calm	2	.46	
29	74	57	66	100	74	97	65	1	SSW	5	.75	
30	61	40	51	93	44	67	41	6	SSW	11		
Avg.	68	48	58	100	38	88	55	1	S	11	5.07 Total	

Monthly Max = 81°F
Monthly Min = 24°F
Peak Gust = 26 MPH on 29 September.

Table A7 Monthly Meteorological Summary

October1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	48	32	40	100	56	86	37		Calm	2		
2	48	39	44	100	66	94	42	2	N	3	.10	
3	42	38	40	100	66	82	35	2	NNW	11		
4	49	29	39	100	38	76	32	2	NNW	7		
5	66	29	48	99	47	82	43	1	SSW	2		
6	75	40	58	100	47	98	57	1	SSW	9		
7	61	36	49	100	45	77	42	2	SSW	8		
8	50	29	40	100	40	74	33	1	NNW	5	T	
9	56	29	43	100	42	79	37	1	N	3		
10	53	35	44	100	66	83	39	2	NNW	4		
11	56	29	48	100	37	76	41		Calm	2		
12	57	34	41	100	69	89	38	2	SSW	8	T	
13	53	30	42	100	39	78	36	2	NNW	7		
14	59	30	45	100	70	97	44	2	SSW	9	.07	
15	60	41	51	100	72	92	50	3	SSW	6	.18	
16	44	40	42	100	99	100	42	1	N	3	.49	
17	47	41	44	100	97	100	44	1	SSW	3	.09	
18	41	23	32	100	35	63	21	3	NNW	8	.02	
19	41	20	31	100	38	71	23	2	NNW	5	T	
20	33	29	31	74	58	67	22	7	NNW	14	T	
21	38	27	33	86	47	68	24	3	NNW	11		
22	61	22	42	100	29	70	36	1	SSW	5		
23	59	36	48	87	38	62	36	2	NNW	11		
24	52	25	39	100	31	68	30	1	NNW	7		
25	46	26	36	100	66	92	34	1	S	3	.03	
26	50	36	43	99	42	60	30	2	NNW	5		
27	46	23	35	92	34	54	20	4	NNW	14	T	
28	52	18	35	100	32	73	27	1	SSW	2		
29	62	26	44	100	54	91	42	1	SW	2		
30	59	39	46	100	72	90	43	1	S	4	.01	
31	65	53	59	100	84	97	58	1	SSW	5	.16	
Avg.	56	32	42	100	29	80	37	2	NNW	14	1.15 Total	

Monthly Max = 75°F
Monthly Min = 18°F
Peak Gust = 32MPH on 27 October.

Table A8 Monthly Meteorological Summary

November 1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	75	53	64	100	55	84	59	3	SSW	15		
2	49	27	38	100	58	77	32	4	NNW	10		
3	52	23	38	100	52	87	35	1	NNE	2		
4	52	38	45	100	94	99	45	1	N	3	.35	
5	43	41	42	99	99	99	42	1	NE	3	.55	
6	49	38	44	99	78	93	42	1	NE	3		
7	51	28	40	97	52	90	37	1	NNE	2		
8	52	32	42	96	42	70	33	2	NNW	5		
9	47	24	36	96	48	80	31	3	NNW	9		
10	50	25	38	M	M	M	M	1	NNE	2		
11	57	26	41	M	M	M	M	1	N	1		
12	51	37	44	92	86	89	41	2	SSE	6		
13	50	28	39	98	47	80	34	4	SSW	11	.26	
14	53	24	39	98	49	79	33	3	SSE	14	.06	
15	41	29	35	98	50	74	28	3	S	9	.21	
16	39	29	34	98	50	72	26	2	S	5		
17	31	23	27	99	98	99	27	2	S	1	.13	
18	48	24	36	99	64	96	35	2	SE	4	.04	T
19	47	27	38	98	61	93	36	1	N	2	.02	
20	44	28	36	98	91	98	35	2	ESE	5	.48	
21	44	22	33	98	78	93	31	5	NNW	13	.98	
22	25	18	21	80	62	77	15	10	NNW	15		
23	40	13	22	99	49	82	17	1	S	5		
24	42	24	33	100	81	94	31	2	SSW	5		
25	39	20	31	100	79	95	30	5	NNW	11	.03	
26	22	17	19	90	54	66	10	10	NNW	22	.01	T
27	32	13	20	97	30	59	8	5	NNW	14	.01	T
28	30	13	18	98	49	82	13	2	N	5		
29	33	18	24	95	46	77	18	4	NNW	8		T
30	34	13	23	99	53	82	18	4	N	10		
Avg.	43	26	35	100[1]	30[1]	84[1]	30[1]	3	N	22	3.13 Total	T

Monthly Max = 75°F
Monthly Min = 13°F
Peak Gust = 31 MPH on 26 November.

1. 28 days data
M. = Missing

Table A9 Monthly Meteorological Summary

December 1974

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	28	13	21	100	70	96	20	2	N	8		
2	44	20	32	100	72	95	31	5	NE	14	.15"	
3	36	26	31	98	67	79	26	6	NNW	13	.03	
4	26	10	18	78	46	60	7	9	NNW	18		
5	26	7	17	98	43	80	12	2	N	5		
6	30	10	20	99	66	89	17		Calm	3		
7	33	13	23	99	86	95	22	1	S	2		
8	57	31	44	100	81	97	43	6	SE	15	.22	
9	53	26	39	100	69	82	34	3	SSW	7	.04	
10	35	22	29	82	43	67	20	3	S	8	.03	
11	38	26	32	96	69	82	27	2	S	7		
12	35	27	31	96	87	95	30	1	S	3	.15	2
13	35	29	32	96	96	96	31	1	S	4	.02	2
14	36	25	31	96	70	91	29	3	N	7	.03	2
15	32	17	25	96	42	76	19	3	NNW	7		2
16	33	20	27	96	55	85	24	3	NE	7	.42	6
17	41	27	34	96	74	92	32	1	NNW	3	.22	6
18	38	28	33	96	62	83	29	2	SSW	6	T	6
19	34	29	32	96	62	77	26	2	S	7		6
20	34	25	30	96	96	96	29	1	NE	5	.01	6
21	37	28	33	96	86	95	32	1	S	2		6
22	38	23	31	96	65	89	28	2	NE	6	.10	7
23	34	17	26	98	77	94	25	1	S	7	.02	7
24	40	22	31	98	68	91	29	1	NNW	4	.20	6
25	34	14	24	97	76	94	23	2	NNW	10		10
26	23	-2	11	96	58	87	8	1	NE	6		10
27	25	0	13	96	86	95	12	1	S	3		10
28	39	14	27	96	56	85	23	2	NNW	11		9
29	29	10	20	97	92	96	19	1	N	3		9
30	40	15	28	97	58	88	25	2	NNW	7		8
31	34	8	21	97	60	90	19		Calm	2	.10	8
Avg.	35	19	27	96	69	88	24	2	NNW	18	1.74 Total	10 Max

Monthly Max = 57°F
Monthly Min = -2°F
Peak Gust = 28 MPH on 3 December.

Table A10 Monthly Meteorological Summary

January 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed (MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	33	22	28	96	74	92	26	2	NNW	6	.10	10
2	29	10	19	96	35	71	11	m	m	m	.01	10
3	24	2	13	96	70	93	11	m	SSW	m		10
4	39	18	29	96	54	86	25	2	SSW	6		10
5	32	8	20	97	49	83	16	2	NE	13		10
6	26	-1	13	98	36	85	9	2	SSE	9		10
7	32	26	29	98	97	97	28	1	NE	6	.18	12
8	39	27	33	97	73	94	31	1	S	7	T	11
9	35	31	33	97	74	95	32	2	SSE	10	.37	11
10	37	31	34	97	95	96	33	2	SSE	7		9
11	43	34	39	96	96	96	38	3	SSE	8	.02	6
12	42	28	35	97	36	80	29	1	S	5		5
13	33	24	29	97	71	94	27	2	NE	10	.10	6
14	27	13	20	97	44	80	15	2	NW	8	.01	6
15	24	10	17	97	45	77	11	2	S	8		6
16	27	9	18	96	60	90	16	4	S	11		7
17	20	-5	8	96	31	61	-7	4	NNW	11		7
18	24	-7	9	96	91	96	8	1	SW	4	.42	14
19	38	23	31	96	56	81	26	m	m	m		12
20	27	-11	8	97	49	66	-1	m	m	m		12
21	22	-14	4	97	50	87	1	2	S	6	.03	12
22	34	1	18	97	55	80	13	4	NNW	11		12
23	21	-9	6	97	39	80	1	1	NE	6	T	12
24	40	7	17	97	48	83	13		Calm	3		11
25	35	25	30	97	97	97	29	1	S	7	.88	10
26	35	20	28	98	67	88	25	7	S	17	.17	11
27	28	8	18	98	57	85	14	1	N	3	T	11
28	33	8	21	98	58	87	18	1	NW	6	.01	11
29	42	12	27	97	59	93	25	3	SW	14	.45	12
30	26	4	15	86	32	60	4	8	N	20		11
31	28	-2	13	97	35	78	8		Calm	3		11
Avg.	31	11	21	98	31	85	17	2[1]	W[2]	20[1]	2.75 Total	14 Max

Monthly Max = 43°F
Monthly Min = -14°F
Peak Gust = 33 MPH on 29 January.

1. 27 days data
2. 28 days data

Table A11 Monthly Meteorological Summary

February 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed (MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	26	3	15	97	38	84	11	3	N	10		11
2	27	-4	12	97	32	73	5	1	SW	7		11
3	24	-3	11	97	30	69	3	5	NNW	17		11
4	13	-6	4	89	46	66	-6	2	NE	5		11
5	23	7	15	97	80	94	14	1	N	2	.29	18
6	31	22	27	97	97	97	26		Calm	1	.34	21
7	39	10	25	97	50	83	21	2	NW	7	T	20
8	28	-2	13	97	52	78	8	5	S	15	.02	20
9	23	-5	9	98	71	91	7	3	NE	8		21
10	21	-16	3	98	46	87	0	1	SSW	7		21
11	21	0	11	100	97	99	11	1	N	3	.02	22
12	14	-9	3	100	100	100	3		Calm	1		22
13	20	-11	5	100	58	86	2	4	NNW	12		22
14	28	-7	11	100	52	79	6	4	NNW	8	.02	22
15	35	-3	16	100	44	81	11	1	N	4		20
16	40	15	28	100	72	93	26	2	N	6	.02	18
17	40	9	25	100	50	87	22	4	ESE	10	.15	18
18	33	27	30	99	96	99	30	2	S	8	.07	20
19	40	29	35	99	57	87	32	2	SSW	8	.02	18
20	40	27	34	99	47	72	26	3	NNW	12	T	18
21	39	19	29	99	48	84	25	2	NNW	8		18
22	49	11	30	99	38	72	22	1	S	7		16
23	43	33	38	100	72	95	37	1	S	5		15
24	38	33	36	100	100	100	36	3	SSW	10	.72	14
25	40	33	37	100	60	90	35	8	S	20	.04	12
26	37	33	35	82	52	62	24	12	SSW	22		11
27	36	27	33	90	46	67	23	7	SSW	16		11
28	37	24	31	96	46	72	23	3	S	9		11
Avg.	32	11	21	100	30	84	17	3	N	22	1.71 Total	22 Max

Monthly Max = 43°F
Monthly Min = -16°F
Peak Gust = 39 MPH on 26 February.

Table A12 Monthly Meteorological Summary

March 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	37	22	30	98	39	79	24	2	NW	9	.02	12
2	32	12	22	98	48	77	16	4	N	8	T	11
3	28	19	24	M	M	M	M	4	NW	8		11
4	30	14	22	98	40	64	12	5	M	15		11
5	35	5	20	100	38	72	13	1	M	7		11
6	32	18	25	100	99	99	25	1	SSW	4	.04	12
7	43	26	35	99	55	90	33	3	SE	7	.18	11
8	33	11	22	99	57	76	16	9	NNW	16	.05	12
9	30	5	18	100	32	56	5	6	NNW	14		12
10	30	6	18	100	58	87	15	2	SSE	8		12
11	38	20	29	100	51	84	25	2	N	4		11
12	35	18	27	100	80	98	26	4	SSE	15	.11	11
13	43	25	34	100	40	71	26	5	NNW	12	.01	10
14	31	17	24	100	33	61	13	6	NNW	12	.05	10
15	35	12	24	100	58	85	20	6	N	14	.09	12
16	50	2	26	100	28	74	19	1	S	7		9
17	47	18	33	100	33	74	26	1	ENE	6		8
18	50	16	33	100	31	65	23	3	SSW	11		6
19	50	28	39	100	78	95	38	3	ESE	12	.01	5
20	51	31	41	100	82	98	40	6	NNW	20	.84[4]	3
21	37	22	30	77	28	51	14	9	NNW	16		2
22	33	16	25	100	53	86	22	1	SSE	7	.04	2
23	48	27	33	100	38	73	25	M	M	M	.03[4]	0
24	42	21	32	100	52	89	29	M	M	M	.08	
25	55	32	44	100	74	98	43	M	M	M	.13	
26	34	11	23	100	57	70	15	9	NNW	20		
27	23	8	16	73	43	54	3	10	NNW	18		
28	40	11	26	65	38	49	9	7	NNW	12		
29	39	16	28	100	39	84	24	2	SSW	7		
30	39	30	35	100	53	89	32	3	SSW	8	.04[4]	
31	35	18	27	77	28	48	10	7	NNW	17		
Avg.	38	22	28	100[1]	28[1]	74[1]	21[1]	4[2]	NNW[2]	20[3]	1.72[5] Total	12 Max

Monthly Max = 55°F
Monthly Min = 2°F
Peak Gust = 34 MPH on 8 March.

M = missing
1. 30 days data
2. 26 days data
3. 28 days data
4. Days data estimated from Met Records
5. Total estimated due to missing data

Table A13 Monthly Meteorological Summary

April 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	41	18	30	100	64	86	26	2	NNW	6		
2	46	17	27	100	32	67	18	2	SSW	7		
3	37	31	34	99	89	99	34	5	ESE	20	1.17[2]	T
4	34	28	31	99	91	97	30	7	NNW	12	.15[2]	7
5	36	26	31	99	72	90	28	7	NNW	12		6
6	38	28	33	99	68	83	29	7	NNW	12	.02	5
7	33	27	30	100	72	86	26	7	NNW	13		5
8	35	28	32	92	66	75	25	7	NNW	12		4
9	35	26	31	84	57	68	22	7	NNW	14		4
10	45	16	31	100	43	64	21	4	NNW	11		4
1.	46	23	35	100	37	68	26	2	NNW	8		2
12	48	20	34	100	30	64	23	2	NNW	4		1
13	43	22	33	100	45	67	23	4	N	10		
14	53	26	40	100	27	67	30	3	N	9		
15	57	23	40	100	30	67	30	1	NNE	6		
16	58	29	44	100	31	67	34	2	N	10		
17	62	27	45	100	25	65	29	M	M	M		
18	61	26	44	100	33	68	34	2	S	11		
19	65	45	55	100	35	79	49	5	SSW	22	.10	
20	49	37	43	100	50	67	33	8	SSW	15		
21	41	29	35	70	33	51	19	7	NNW	19		
22	53	24	39	100	33	62	27	M	M	M		
23	65	22	44	100	24	55	29	M	M	M		
24	48	39	44	100	42	98	43	1	SSE	5	.19	
25	53	41	47	100	60	84	43	4	N	12		
26	54	33	44	100	37	74	36	6	NNW	18		
27	49	36	43	100	53	78	37	8	NNW	21		
28	45	27	36	100	45	72	28	4	NNW	12		
29	60	23	42	100	30	70	33	2	SSE	6		
30	67	28	48	100	27	62	36	3	N	14		
Avg.	49	28	38	100	24	73	30	4[1]	NNW[1]	22[1]	2.17[3] Total	7 Max

Monthly Max = 67°F
Monthly Min = 16°F
Peak Gust = 43 MPH on 20 April.

1. 27 days data
2. day's total incomplete
3. Total from neaby raingage
M = missing

Table A14 Monthly Meteorological Summary

May 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	65	32	49	100	40	67	39	3	S	11		
2	55	47	51	100	76	94	50	3	S	9	.03	
3	65	39	52	100	33	M	M	M	M	M		
4	51	36	44	100	72	97	93	M	M	M	.13	
5	62	40	51	100	36	72	42	3	NNW	10		
6	68	38	53	98	32	66	42	2	NNE	10		
7	65	41	53	98	31	64	41	10	N	23		
8	68	38	53	98	25	63	41	4	NNW	16		
9	74	31	53	97	21	52	36	3	NE	9		
10	75	38	57	89	27	63	45	2	S	10		
11	78	40	59	89	22	61	46	M	M	M	.27	
12	79	44	62	100	33	73	54	M	M	M		
13	74	51	63	100	47	87	59	1	N	5		
14	81	47	64	100	23	66	53	2	N	9		
15	82	45	64	100	28	53	47	6	NW	12		
16	74	47	61	100	39	72	52	5	S	15	.11	
17	76	40	58	100	29	61	46	1	N	6		
18	79	45	62	100	36	60	47	4	S	12		
19	84	50	67	100	44	M	M	1	SE	4		
20	91	54	73	100	31	66	57	1	SSW	5		
21	89	56	73	100	40	73	64	2	ESE	13	.01	
22	84	57	71	100	56	82	65	c	CALM	4		
23	91	58	75	100	43	83	70	1	NE	10		
24	85	54	70	100	27	66	58	3	NNW	11		
25	65	47	56	100	55	73	48	2	SE	8		
26	70	48	59	100	54	81	57	M	M	M		
27	77	54	66	100	60	88	63	3	SSW	15	.03	
28	74	47	61	100	34	62	48	4	NNW	19		
29	78	43	61	100	31	68	51	2	NNW	9		
30	72	50	61	100	41	87	57	1	SSE	6	.17	
31	80	56	68	100	71	96	67	2	SW	7	.20	
Avg.	91	31	60	100	21	72[1]	53[1]	3[2]	SE[2]	23[2]	0.95	Total

Monthly Max = 91°F
Monthly Min = 31°F
Peak Gust = 26 MPH on 28 May.

M = Missing
1. 29 days data
2. 26 days data

Table A15 Monthly Meteorological Summary

June 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	73	58	66	100	84	99	66	1	SSW	7	.20	
2	73	47	60	100	41	75	52	m	m	m		
3	61	45	53	100	70	93	51	1	ESE	3		
4	61	49	55	100	72	97	54	1	NE	3	.07	
5	63	49	56	100	55	86	52	3	SSE	10	.28	
6	52	46	49	100	81	99	49	3	S	8	.74	
7	56	46	51	100	81	97	50	2	NNW	5	.06	
8	59	38	49	100	51	78	43	5	NNW	14		
9	61	36	49	100	36	76	42	2	NNW	12		
10	75	35	55	100	28	66	44	3	NNW	14		
11	81	40	61	100	31	71	52	1	S	5		
12	61	51	56	100	100	100	56	1	S	12	1.03	
13	69	60	65	100	87	98	65	1	SSE	3	.53	
14	76	60	68	100	61	88	65	3	SE	10	.02	
15	71	65	68	100	76	90	65	m	m	m		
16	67	62	65	100	90	98	65	3	SE	15	T	
17	82	63	73	100	53	85	68	1	S	7		
18	85	62	74	100	60	89	71	3	S	13	.03	
19	81	59	70	100	54	82	71	1	NW	m	.02	
20	71	48	60	100	38	74	52	m	NNW	m		
21	79	44	62	100	34	74	54	1	N	6		
22	86	47	67	100	34	75	59	1	SSE	5		
23	93	58	76	100	51	84	68		S	4		
24	88	62	75	100	47	77	68	2	NW	6		
25	79	52	66	100	37	73	57	2	N	7		
26	82	46	64	100	45	76	56	1	S	9		
27	82	50	66	100	37	71	56	m	m	m		
28	82	52	67	100	51	87	63	m	m	m	.12	
29	84	62	73	100	52	91	70		calm	4	.06	
30	80	49	65	100	38	73	56	1	N	8		
Avg.	74	51	63	100	28	84	58	2[1]	S[2]	15[3]	3.16	Total

Monthly Max. = 93°
Monthly Min. = 35°
Peak Gust = 27 MPH on 20 June.

1. 25 days data
2. 26 " "
3. 24 " "

Table A16 Monthly Meteorological Summary

July 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	85	45	65	100	33	76	57		calm	2		
2	88	48	68	100	43	79	61		calm	6		
3	82	56	69	100	44	75	61	2	NNW	12		
4	82	50	66	100	43	81	60		calm	2		
5	85	56	71	100	42	77	64		calm	calm		
6	86	54	70	100	48	80	64	1	ESE	6		
7	83	60	72	100	61	86	63	1	SSE	5		
8	87	61	74	100	53	85	69	1	S	3		
9	84	62	73	100	61	95	72	1	S	6	.30	
10	82	64	73	100	52	86	69		calm	2		
11	81	60	71	100	50	82	66	2	S	8		
12	72	58	65	100	83	96	64		calm	2	.03	
13	69	64	67	100	100	100	67	M	m	m	2.28	
14	78	68	73	100	82	98	73	M	m	m	.25	
15	79	62	71	100	62	92	69		calm	3	.36	
16	82	61	72	100	75	97	71	M	m	m		
17	86	64	75	100	48	83	70	1	S	3		
18	88	61	75	100	42	85	70		calm	2		
19	85	63	74	100	59	85	69	2	S	8		
20	81	68	75	100	72	90	72	M	m	m		
21	79	61	70	100	66	94	69	M	m	m	.70	
22	82	60	71	100	52	84	66		calm	2		
23	88	60	74	100	55	85	69		calm	3		
24	87	63	75	100	69	91	73	3	S	14	.65	
25	78	54	66	100	54	87	62	m	m	m	.01	
26	74	50	62	100	45	76	55	1	NW	3		
27	79	49	64	100	42	82	64	2	S	14		
28	82	60	71	100	53	82	66	3	S	14	.02	
29	79	55	67	100	51	83	62	2	NW	10		
30	88	54	71	100	51	83	66	2	S	5		
31	91	62	77	100	63	87	73	1	N	6		
Avg.	82	58	71	100	33	86	64	1[1]	S[1]	14[1]	4.60	Total

Monthly Max. = 91°
Monthly Min. = 45°
Peak Gust = 18 MPH on 3 July.

1. 25 days data

Table A17 Monthly Meteorological Summary

August 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	98	70	84	100	51	76	76	4	NW	8		
2	99	70	85	100	46	73	68	1	NNW	5		
3	93	70	82	100	60	80	75	1	SE	26		
4	72	68	70	100	100	100	100	2	SE	8	.20	
5	89	68	79	100	48	74	70	2	N	14	.05	
6	68	60	64	100	79	90	61	3	N	11		
7	70	59	65	100	m	m	m	2	N	6	1.40	
8	81	57	69	100	54	77	62	2	N	10	.35	
9	86	54	70	100	36	68	59	1	SSW	6		
10	88	58	73	100	48	74	64	1	NW	9		
11	85	62	74	100	50	75	66	2	S	12	.10	
12	81	60	71	100	61	81	65	1	SSW	20		
13	83	60	72	100	48	74	69	1	S	10		
14	82	57	70	100	40	70	60	2	S	20		
15	77	53	65	100	39	70	55	2	NNW	18		
16	81	56	69	100	38	69	59	2	ESE	9		
17	81	57	69	100	69	85	64	2	S	7		
18	80	55	68	100	27	64	56	3	SSW	19		
19	74	49	62	100	35	68	51	2	NNW	14		
20	73	46	60	100	30	65	48	2	NNW	20	T	
21	75	43	59	100	31	65	47	3	SSE	13		
22	74	48	61	100	61	81	55	4	NNW	26	.06	
23	72	46	59	100	31	65	48	2	NNW	17	.34	
24	57	44	51	100	100	100	51	m	m	m		
25	76	57	67	100	69	85	62	1	ESE	8		
26	76	64	70	100	68	84	65	2	S	7	T	
27	80	54	67	100	39	70	57	2	NW	16		
28	77	52	65	100	37	69	55	1	S	9		
29	65	52	58	100	71	86	54	C	NE	10	.95	
30	60	48	54	100	84	92	52	3	N	9	.54	
31	67	44	56	100	41	71	47	2	N	m		
Avg.	78	56	67	100	51[1]	74[1]	59[1]	3[1]	NNW[1]	13[2]	3.99	Total

Monthly Max. = 99°
Monthly Min. = 43°
Peak Gust = 26 MPH on 3 and 22 August.

M = missing
1. 30 days data
2. 29 days data

Table A18

Monthly Meteorological Summary

September 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	67	43	55	100	43	72	46	1	SSW	10	.02	
2	64	53	59	100	84	92	52	2	SSW	9	.25	
3	60	51	55	100	62	81	50	5	NNW	18		
4	72	49	61	100	42	72	52	2	NNW	13	T	
5	74	50	62	100	37	69	52	2	S	13		
6	70	50	60	100	74	87	51	3	S	9	.19	
7	70	46	58	100	45	73	50	2	N	13		
8	76	48	62	100	57	79	56	2	SSE	14	.30	
9	60	45	53	100	53	77	46	2	S	14	.03	
10	64	40	52	100	37	69	42	2	NNW	21		
11	74	42	58	100	42	72	57	7	S	23		
12	67	49	58	100	84	92	56	6	S	23	.28	
13	58	42	50	100	47	74	42	1	V	8	.06	
14	54	38	46	100	53	77	49	4	NNW	22		
15	62	42	52	100	40	90	43	3	S	12		
16	62	42	52	100	62	81	47	2	S	8		
17	60	49	55	100	74	87	47	M	M	M	.05	
18	63	47	55	100	51	76	48	M	M	M	.05	
19	58	52	55	100	100	100	55	M	M	M	.34	
20	70	57	64	100	73	87	60	M	M	M	.15	
21	73	51	62	100	36	68	52	M	M	M	.05	
22	67	45	56	100	42	72	47	2	V	19		
23	62	53	58	100	64	82	53	2	S	9	.45	
24	53	50	52	100	99	100	52	4	NNE	10	.33	
25	52	48	50	100	82	91	48	2	NNE	9	.20	
26	58	48	53	100	95	98	53	2	S	10	.87	
27	67	52	60	100	64	82	55	2	N	9		
28	63	44	54	100	49	75	46	3	NW	18		
29	73	44	59	100	37	69	49	1	NNE	7		
30	69	44	57	100	48	74	49	2	S	12		
Avg.	65	47	56	100	59	80	50	3[1]	N&S[1]	13[1]	3.62	Total

Monthly Max. = 76°
Monthly Min. = 38°
Peak Gust = 23 MPH on 11 and 12 September.

V = Variable
M = Missing
1. 25 days data

Table A19

Monthly Meteorological Summary

October 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	70	48	59	100	59	83	54	M	M	M		
2	59	42	51	100	55	75	44	M	M	M	.05	
3	58	33	46	97	34	54	31	M	M	M		
4	59	33	46	100	29	74	38	3	N	10		
5	53	32	43	100	38	79	M	2	S	10		
6	67	47	57	100	40	75	49	6	S	14		
7	59	35	47	100	28	60	34	6	NNW	11		
8	65	31	48	100	36	76	41	4	ENE	10		
9	56	34	45	100	45	82	40	M	M	M		
10	56	35	46	100	52	91	44	2	NNW	3		
11	51	48	49	100	78	91	47	3	E	5	1.19	
12	49	47	48	100	84	97	47	4	NNW	9	.31	
13	56	48	52	100	65	85	48	4	NNW	7	.21	
14	63	46	55	100	48	87	51	2	NNW	10		
15	63	45	54	100	58	88	51	M	M	M	.03	
16	58	47	53	100	36	64	42	5	NNW	12	.02	
17	53	39	46	100	49	71	37	5	N	9	.17	
18	45	41	43	100	88	100	43	4	NNE	6	1.83	
19	47	42	45	100	68	93	43	2	E	5	.75	
20	47	42	45	100	100	100	45	2	S	4	.87	
21	62	41	52	100	46	83	47	3	SSE	11	.01	
22	65	38	52	100	38	79	46	2	N	8	.01	
23	66	36	51	100	33	81	46	2	NNE	5	.01	
24	69	38	54	100	39	81	49	4	E	12		
25	60	41	51	100	88	98	50	M	M	M	.14	
26	53	34	44	100	46	78	38	M	M	M		
27	58	34	46	100	100	100	46	M	M	M		
28	68	40	54	100	46	M	M	M	M	M		
29	51	39	45	100	65	95	44	4	E	10		
30	44	33	39	70	46	54	24	14	NNW	20		
31	41	27	34	85	28	53	19	8	NNW	14		
Avg.	57	39	49	100	28	81[1]	43[2]	4[3]	N[3]	20[3]	5.60	Total

Monthly Max. = 70°
Monthly Min. = 27°
Peak Gust = 30 MPH on 30 October.

1. 30 days data
2. 29 days data
3. 22 days data
M = Missing

Table A20

Monthly Meteorological Summary

November 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	53	27	40	96	26	50	23	8	SSE	14		
2	62	41	52	100	37	74	44	4	SSE	8		
3	66	43	55	100	72	97	54	4	E	8	.16	
4	65	41	53	100	23	69	43	6	VAR	13	.24	
5	57	34	46	100	29	61	33	9	NNW	19		
6	59	29	44	100	31	79	38	3	S	6		
7	65	33	49	100	51	83	44	4	S	8		
8	69	49	59	100	62	92	57	6	S	12	.51	
9	65	41	53	100	38	89	61	3	N	6		
10	56	41	49	100	80	97	48	6	SSW	11	.48	
11	57	32	45	100	30	m	m	8	SSW	14		
12	50	30	40	100	56	95	39	4	S	7	.62	
13	47	43	45	100	100	100	45	4	NE	8	.42	
14	45	30	38	100	78	90	35	4	W	6	.25	
15	38	29	34	100	38	69	25	4	SE	9		
16	37	28	33	100	76	91	31	2	NE	5		
17	49	31	40	100	44	77	34	2	N	5		
18	56	30	43	100	33	85	39	4	NE	10		
19	45	27	36	100	40	83	32	3	NE	6		
20	58	29	44	100	50	88	41	2	N	4		
21	47	32	40	100	96	99	40	4	VAR	6	1.07	
22	40	28	34	100	58	72	26	5	SSW	11		
23	40	25	33	100	44	79	27	3	VAR	7		
24	34	28	31	100	64	80	26	4	N	7		
25	35	28	32	77	50	m	m	m	m	m		
26	35	26	31	100	56	79	25	3	NE	5		
27	35	28	32	100	88	90	30	4	VAR	10	.47	
28	36	31	34	100	68	91	32	4	SSW	9	.01	T
29	33	28	31	100	58	74	24	5	NNW	13		T
30	55	29	42	100	61	88	39	m	m	m		0
Avg.	50	32	41	100	23	83[1]	37[1]	5[1]	NE[1]	19[1]	4.23 Total	T Max

Monthly Max. = 69°
Monthly Min. = 25°
Peak Gust = 38 MPH on 8 November.

M = Missing
1. *28 days data*

Table A21

Monthly Meteorological Summary

December 1975

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	57	30	44	100	45	71	35	m	m	m		
2	35	26	31	100	45	71	28	2	S	4		
3	30	18	24	100	58	78	18	4	W	10		
4	24	3	14	100	48	67	5	4	N	8		T
5	38	0	19	100	49	85	15	2	S	8		T
6	46	22	34	100	m	m	m	5	W	17	.03	0
7	21	0	11	100	47	57	-1	7	N	13		0
8	26	-2	12	100	m	m	m	2	NNE	3	.02	T
9	38	22	30	100	74	91	28	4	NE	12		0
10	41	36	39	100	80	97	38	3	E	6	.60	
11	41	22	32	100	28	60	20	5	NNW	13		
12	25	11	18	90	36	63	8	4	NE	7		
13	27	16	22	100	63	81	17	4	E	7	.05	2
14	38	27	33	100	100	100	33	1	E	3	.02	1
15	45	31	38	100	80	98	37	3	E	9	.03	0
16	31	6	19	92	54	74	12	7	NNW	11		
17	29	3	16	100	54	82	12	m	m	m		
18	27	-1	13	100	38	70	5	7	NNW	13		
19	5	-14	-5	95	39	70	-12	6	NW	14		
20	4	-15	-6	100	70	92	-4	3	NNE	6	.13	0
21	17	5	11	100	94	99	11	6	NNE	8	.07	10
22	25	16	21	100	65	87	18	7	NNW	13	.31	7
23	21	-1	10	82	53	67	1	10	NNW	14		7
24	3	-16	-7	96	45	71	-16	4	N	10		5.5
25	13	-16	-2	100	62	88	-5	3	E	5		5.5
26	33	13	23	100	100	100	23	2	E	5	1.06	13
27	36	17	27	100	77	88	24	6	NE	10	.03	12.5
28	24	-1	12	100	62	88	9	3	NNE	7		12
29	21	-9	6	100	60	91	4	2	NE	4		12.5
30	30	-5	13	100	86	98	12	1	VAR	3	.07	13
31	41	30	36	100	60	84	32	3	SW	7	.18	12
Avg.	29	9	19	100	28[1]	82[1]	14[1]	4[1]	NW[1]	17[1]	2.60 Total	13 Max

Monthly Max. = 57°
Monthly Min. = -16°
Peak Gust = 30 MPH on 6 December.

1. 29 days data

Table A22

Monthly Meteorological Summary

January 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	31	7	19	m	m	m	m	9	m	13		12
2	19	-7	6	100	m	m	m	1	m	5		12
3	28	12	20	100	m	m	m	1	S	6	.27	12
4	29	-3	13	m	m	m	m	m	m	m	.01	14
5	10	-17	-4	m	m	m	m	m	m	m		13.5
6	10	-27	-9	100	51	85	-12		calm	2		13.5
7	36	0	18	100	47	81	13	2	SSW	7		13.5
8	28	-13	8	100	42	81	3	5	NE	10	.02	14
9	14	-24	5	100	44	78	0	2	VAR	7		14
10	10	-20	-5	98	46	80	-10	3	NNW	9		14.5
11	-1	-27	-13	97	84	92	-15	3	NNE	5		14.5
12	25	-2	12	100	81	95	10	1	NNE	3		18.5
13	31	10	11	100	64	89	9	2	S	6	.01	20
14	41	26	34	100	42	67	24	10	SW	15	.40	19.5
15	26	-1	13	m	m	m	m	7	SSW	11	.03	18.5
16	20	-1	10	100	83	97	9	3	E	5	.08	18.5
17	20	-2	9	100	43	63	-1	9	NNW	14		18
18	3	-16	-7	77	34	57	-15	6	NE	12		17
19	14	-27	-6	m	m	m	m	m	m	m	.03	17
20	27	-3	12	100	65	87	9	m	m	m		17
21	34	9	12	100	58	90	10	3	SSW	7	.07	17
22	25	-15	10	100	46	69	2	7	NNW	14	.06	17
23	4	-23	10	78	36	53	-4	6	N	13		17
24	5	-12	-4	100	51	74	-10	4	E	6	.02	17
25	26	-2	12	100	55	81	7	3	VAR	13		18
26	35	26	31	100	61	95	30	7	S	14	.68	16.5
27	47	35	41	100	100	100	41	5	NE	10	1.07	14
28	35	20	28	100	61	84	24	5	W	10	.32	13
29	32	15	24	99	69	85	20	4	SSW	7	.02	12.5
30	27	9	18	m	m	m	m	6	NNW	10		12.5
31	20	-4	8	99	39	69	0	2	VAR	5		12.5
Avg.	23	-4	10	100[1]	34[2]	77[2]	6[2]	1[3]	VAR[1]	15[3]	3.09 Total	20 Max

Monthly Max. = 47°
Monthly Min. = -27°
Peak Gust = 31 MPH on 14 January.

1. 25 days data
2. 23 days data
3. 27 days data
M = Missing

Table A23

Monthly Meteorological Summary

February 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	40	20	30	100	71	92	28	4	SSW	12	.44	12
2	38	1	19	100	56	80	14	11	SSW	17	1.00	14
3	27	3	15	100	36	64	5	6	SSW	12	T	14
4	35	1	18	99	44	74	11	6	SSW	18	.01	13
5	18	1	9	83	36	56	-4	6	NE	10		13
6	13	-6	4	100	53	77	-2	3	N	6		13
7	20	-14	3	100	38	81	-2	3	W	10		13
8	29	-13	8	100	66	88	5	3	SSW	8	.01	13
9	39	9	24	100	49	83	20	3	N	8	.02	13
10	41	5	23	100	47	71	15	5	SSW	13		13
11	41	26	34	96	51	74	27	5	NNW	15		13
12	35	19	27	100	28	50	11	5	NNW	12	.03	13
13	52	33	43	80	41	59	30	7	SSW	11		12.5
14	32	5	19	81	38	49	3	9	NNE	15		12
15	37	-2	18	100	53	88	16	6	SSW	17	.06	12
16	52	33	43	100	50	61	31	6	NNE	15	.04	11.5
17	38	29	34	100	55	85	30	6	SSE	12	.37	11
18	32	26	29	100	92	100	29	4	SSW	10	.78	12
19	43	33	38	100	50	75	31	6	SSW	13	.23	14
20	39	16	28	98	46	67	9	7	NNW	13		14
21	45	10	28	100	48	82	14	m	m	m	.03	13
22	52	24	38	100	60	90	36	7	SSW	15	.38	10.5
23	23	3	13	94	36	58	1	8	NNW	16	.01	10.5
24	41	1	21	100	46	79	16	3	SSW	9		10.5
25	60	16	38	100	34	81	33	2	VAR	6		10.5
26	61	28	45	100	34	76	38	2	SE	5		8
27	55	33	44	98	25	58	30	6	WNW	13		5
28	45	12	29	94	44	58	16	6	NW	16		3
29	47	9	28	100	52	87	25	4	S	16	T	2
Avg.	39	12	26	100	25	74	18	5[1]	SSW[1]	18[1]	3.42 Total	14 Max

Monthly Max. = 61°
Monthly Min. = -14°
Peak Gust = 38 MPH on 28 February.

M = Missing
1. 28 days data

Table A24

Monthly Meteorological Summary

March 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	41	25	33	100	42	62	23	6	NNE	12	T	1.5
2	25	14	20	100	40	91	18	5	NE	8	.43	6
3	19	16	18	100	75	94	17	4	SE	10	.27	9
4	32	19	26	100	100	100	26	m	m	m	.08	8.5
5	54	32	43	100	55	96	42	m	m	m	T	8
6	52	20	36	96	36	50	20	7	SSW	14		5
7	34	13	44	100	41	69	35	8	SSW	15	T	3
8	27	3	15	100	33	52	1	6	NNW	10		3
9	33	-4	15	100	34	62	5	4	VAR	8		3
10	40	8	24	100	56	68	15	6	S	10	.01	3
11	40	18	29	100	40	69	18	9	W	19	.07	2.5
12	36	6	21	100	24	47	4	6	VAR	14	.13	1.5
13	47	26	38	100	66	90	36	5	W	11	.12	1.5
14	41	28	35	86	35	57	22	6	W	14	T	1.5
15	41	23	32	95	28	51	16	8	W	15		1
16	22	13	18	100	48	78	12	7	N	12	.21	1
17	23	9	16	100	45	76	10	7	NNW	12	.06	6
18	26	-7	9	99	29	61	-2	5	W	12		6
19	38	5	22	99	72	94	20	3	VAR	4	.16	6
20	66	26	46	99	42	77	39	3	S	9		1.5
21	59	35	47	100	57	91	45	5	SSW	12	.14	T
22	37	14	26	90	28	50	10	8	NNW	13	.01	
23	47	7	27	100	32	68	18	5	S	10		
24	69	23	46	98	20	58	32	4	S	8		
25	58	31	45	98	50	78	39	3	SSW	8		
26	59	27	43	98	28	68	33	3	NNW	10		
27	m	26	m	98	30	68	m	7	SSE	14		
28	54	39	42	98	52	65	31	8	NNW	12	.09	
29	57	32	45	94	36	57	31	m	m	m	.56	
30	63	27	45	99	40	69	36	m	m	m		
31	51	39	45	98	71	85	41	7	SE	12		
Avg.	43	19	31	100	20	71	23	6	VAR	19	2.34 Total	9 Max

Monthly Max. = 69°
Monthly Min. = -7°
Peak Gust = 40 MPH on 7 March.

Table A25

Monthly Meteorological Summary

April 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	53	40	47	98	91	98	47	5	SSE	8	1.60	
2	56	32	44	98	41	74	36	5	NNW	8		
3	48	38	43	82	56	67	33	10	NNW	17		
4	50	29	40	57	22	37	16	7	NNW	12		
5	60	33	47	56	24	33	20	8	NNW	19		
6	63	28	46	100	28	55	31	4	VAR	8		
7	52	27	40	100	24	62	28	4	VAR	10		
8	50	22	36	100	30	56	22	4	W	8		
9	46	23	35	99	28	53	20	5	N	10		
10	65	20	43	100	23	55	28	3	VAR	10		
11	51	19	35	100	54	76	29	M	M	M	.04	
12	34	15	25	78	24	55	11	M	M	M	.01	
13	62	15	39	100	30	60	27	5	VAR	12		
14	66	26	46	100	19	57	32	5	NNW	12		
15	73	47	60	100	24	60	46	6	SSW	17		
16	76	53	65	100	49	79	59	3	VAR	8		
17	85	52	69	100	32	72	60	M	M	M		
18	86	51	69	100	M	M	M	4	W	9		
19	90	52	71	100	17	56	55	5	SSW	13		
20	86	46	66	98	23	49	47	5	NW	10		
21	74	50	62	100	30	60	47	7	SE	15		
22	52	47	50	100	66	90	47	6	SSE	11	.16	
23	59	45	52	100	51	72	43	7	NNW	11	T	
24	57	32	45	100	21	51	28	5	NW	10	.01	
25	45	37	41	100	59	95	39	3	N	5	.83	
26	42	34	38	100	83	95	36	4	N	8	.34	
27	45	37	41	100	61	81	36	8	NNW	16		
28	51	36	44	100	53	78	38	M	M	M	.04	
29	58	37	43	100	36	70	34	M	M	M		
30	61	32	47	100	24	63	35	M	M	M		
Avg.	60	34.8	48	100	17	67	35	5	NW	19	3.03 Total	

Monthly Max. = 90°
Monthly Min. = 15°
Peak Gust = 43 MPH on 5 April.

Table A26

Monthly Meteorological Summary

May 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	62	29	46	100	28	79	40	7	SE	14	.82	
2	67	46	57	100	45	83	52	4	VAR	6	.07	
3	68	40	54	100	50	77	47	6	W	13	.23	
4	49	32	41	100	46	59	28	7	SSW	12		
5	69	29	49	100	29	59	35	9	S	17		
6	79	43	61	100	M	M	M	7	VAR	16	.10	
7	46	44	45	100	83	96	43	5	SSE	8	.20	
8	55	36	46	89	32	52	30	7	SW	11		
9	64	32	48	100	30	61	35	4	VAR	7	.01	
10	74	36	55	100	28	64	43	4	SSE	9	.01	
11	72	40	56	100	37	67	46	10	SSE	20	.22	
12	55	35	45	100	60	92	43	4	VAR	10	.43	
13	64	32	48	100	26	59	34	M	M	M	.03	
14	76	34	55	100	48	80	49	M	M	M	.35	
15	73	45	59	100	32	64	47	6	NNW	16	.03	
16	76	42	59	100	40	65	47	M	M	M	.03	
17	71	54	63	100	75	91	61	6	SSW	13	.08	
18	72	45	60	100	75	97	59	4	VAR	7	.73	
19	45	37	41	100	87	98	40	8	S	12	1.42	
20	50	37	44	100	59	86	40	3	VAR	5	.06	
21	50	37	44	100	93	99	44	4	NE	8	.08	
22	54	39	47	100	57	83	42	5	NNW	10	.01	
23	63	35	49	100	37	71	40	M	M	M		
24	61	45	53	100	53	72	45	M	M	M	.03	
25	62	48	55	100	51	74	47	M	M	M	.02	
26	59	47	53	100	62	85	49	3	SSW	9	.03	
27	73	45	59	100	23	68	49	5	VAR	14	.04	
28	83	41	62	100	15	63	50	2	VAR	6	.05	
29	77	42	60	100	28	64	48	5	SSW	10	.03	
30	76	50	63	100	42	76	56	3	SSW	9	.03	
31	81	57	69	100	45	83	64	3	VAR	8	.50	
Avg.	65	40	53	100	15	76	46	5	VAR	20	5.64	Total

Monthly Max. = 83°
Monthly Min. = 29°

Peak Gust = 30 MPH on 5 & 11 May

Table A27

Monthly Meteorological Summary

JUNE 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	69	49	59	100	44	82	49	5	NNW	8	.04	
2	70	42	67	100	24	66	56	m	m	m		
3	74	39	58	100	26	73	50	3	VAR	10	.03	
4	77	46	62	100	28	74	54	3	N	6		
5	84	41	63	100	12	66	52	2	VAR	5		
6	80	50	65	100	21	69	55	4	S	10	.13	
7	66	52	59	100	80	96	58	3	VAR	6	.09	
8	88	54	71	100	27	71	61	4	S	9	.01	
9	84	54	69	100	41	76	61	3	VAR	6	.05	
10	88	54	71	100	40	80	65	4	VAR	9	.20	
11	85	58	72	100	39	82	67	5	VAR	12	.25	
12	64	41	53	100	37	67	43	9	NNW	15	.01	
13	74	40	57	100	45	70	48	6	S	11		
14	80	54	67	100	59	81	61	5	SSW	12	.04	
15	90	61	76	100	36	75	68	4	SSW	9	.03	
16	87	65	76	100	35	75	68	6	SSW	12	.93	
17	79	57	68	100	45	83	63	3	VAR	6	.23	
18	82	56	68	100	42	81	62	3	VAR	7	.01	
19	83	62	73	100	50	73	64	6	S	14	.01	
20	82	68	75	100	63	86	71	5	S	10	.51	
21	80	68	74	100	70	97	73	3	VAR	7	.04	
22	82	67	75	100	64	91	72	3	VAR	8	.20	
23	85	65	75	100	52	85	71	3	S	6	.02	
24	87	66	77	100	44	82	71	3	VAR	5		
25	74	63	69	100	67	92	67	4	S	8	.36	
26	81	58	70	100	37	70	60	m	m	m		
27	75	58	67	100	56	81	61	3	VAR	7	.05	
28	85	56	71	100	47	m	m	3	VAR	8	.02	
29	80	59	70	100	58	89	67	2	VAR	5	.14	
30	76	60	68	100	64	93	66	4	VAR	8	.89	
AVG.	80	55	68	100	21	80[a]	62[b]	4[c]	VAR[c]	m[c]	4.29	TOTAL

Monthly Max. = 90°
Monthly Min. = 39°

Peak Gust = 26 MPH on 12 June

A. R.H. Average for 29 days
B Dewpoint Average for 29 days
C Wind Average for 28 days

Table A28

Monthly Meteorological Summary

JULY 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	75	60	68	100	68	89	65	4	VAR	8	.01	
2	76	57	67	100	44	78	60	3	VAR	6		
3	69	55	62	100	60	85	58	2	VAR	4	.01	
4	76	54	65	100	52	83	60	3	N	8	T	
5	88	54	71	100	45	m	m	2	VAR	3	.03	
6	89	61	75	100	35	79	68	2	VAR	4	.03	
7	79	60	70	100	60	86	66	4	S	7	.01	
8	77	62	70	100	55	86	66	5	S	9	.23	
9	76	52	64	100	38	76	56	4	VAR	8	.03	
10	80	50	65	100	36	78	58	3	VAR	5	T	
11	81	55	68	100	48	82	62	4	VAR	9	1.49	
12	74	58	66	100	63	86	62	5	NNW	8	.04	
13	68	56	63	100	66	83	58	6	NW	8	.03	
14	69	58	64	100	63	85	59	5	VAR	10	.01	
15	79	58	69	100	44	77	62	4	VAR	8	.03	
16	78	56	67	100	53	86	63	5	S	11	.13	
17	76	56	66	100	46	78	59	5	SSW	8	.02	
18	71	50	61	100	46	77	54	4	SW	7	.03	
19	85	50	63	100	47	m	m	4	SW	7	.05	
20	85	57	71	100	43	73	62	5	SSW	10	.02	
21	76	52	64	100	43	85	60	4	VAR	8	.56	
22	77	50	64	100	35	73	55	4	VAR	7	.02	
23	78	48	63	100	48	76	56	5	VAR	10	.50	
24	81	57	69	100	49	74	61	6	NW	12	.68	
25	77	47	62	100	40	65	50	7	NNW	13	.05	
26	75	47	61	100	36	72	52	4	SW	6	.05	
27	79	59	69	100	64	92	67	4	VAR	8	.39	
28	76	56	66	100	37	75	58	5	N	9	.09	
29	70	54	62	100	52	88	58	4	VAR	7	.41	
30	63	58	61	100	85	96	59	3	VAR	4	.15	
31	70	60	65	100	71	90	62	4	VAR	7	.02	
AVE	77	55	66	100	35	81[a]	60[b]	4	VAR	11	5.12	TOTAL

Monthly Max = 89
Monthly Min = 47
Peak Gust = 30 MPH on 2 July

a. RH average for only 29 days
b. Dewpoint average for only 29 days

Table A29

Monthly Meteorological Summary

AUGUST 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	67	52	60	100	62	83	55	5	N	14	.66	
2	71	46	59	100	34	76	52	5	VAR	10		
3	75	45	60	100	34	77	58	4	VAR	6		
4	80	50	65	100	44	80	59	4	SSW	8		
5	80	53	67	100	50	76	59	6	SSW	12		
6	73	56	65	100	61	84	60	6	VAR	11	.03	
7	60	54	57	100	93	99	57	3	N	7	.30	
8	66	56	61	100	88	98	60	3	VAR	5	.02	
9	70	62	66	100	97	99	65	3	N	6	.58	
10	72	58	65	100	76	88	61	7	N	11	1.03	
11	84	54	69	100	37	69	58	3	VAR	8	.04	
12	83	57	70	100	52	76	62	5	S	10	.03	
13	79	62	71	100	59	80	65	5	S	9	.08	
14	77	62	70	100	66	83	65	4	VAR	9		
15	80	63	72	100	62	81	66	5	VAR	10	1.25	
16	69	54	62	100	52	76	54	5	SSW	12		
17	74	51	63	100	40	70	53	5	VAR	11		
18	78	48	63	100	37	69	52	3	N	5		
19	77	47	62	100	36	68	52	3	NE	5		
20	82	51	67	100	46	73	58	3	S	6		
21	88	58	73	100	53	77	66	3	VAR	7		
22	91	64	78	100	49	75	69	3	VAR	4		
23	81	55	68	100	46	73	59	6	N	13		
24	74	48	61	100	36	68	51	4	NNW	8		
25	82	49	66	100	32	66	54	3	NNW	6		
26	80	52	66	100	48	74	58	3	SW	5		
27	78	62	70	100	72	86	66	4	S	8	.11	
28	79	61	70	100	74	87	66	4	SSW	10	T	
29	79	54	67	100	42	71	57	5	SSW	8	.25	
30	53	37	49	100	58	79	43	7	NNW	11		
31	70	37	54	100	32	66	48	3	NNW	13		
AVG	75	53	65	100	54	78	58	4	SSW	9	4.38	TOTAL

Monthly Max = 91
Monthly Min = 37
Peak Gust = 22 (MPH) West 10 August

Table A30

Monthly Meteorological Summary

SEPTEMBER 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	71	45	58	100	53	77	51	4	S	7	.41	
2	62	46	59	100	51	76	52	4	N	10	.08	
3	67	38	53	100	46	73	45	3	VAR	7		
4	67	46	57	100	68	84	53	5	S	9		
5	71	49	60	100	44	72	51	4	W	8	.02	
6	62	42	52	100	38	69	42	5	NW	13		
7	66	38	52	100	34	67	42	4	VAR	11		
8	69	44	57	100	38	69	47	4	VAR	10		
9	71	41	56	100	38	69	46	2	VAR	4		
10	64	45	55	100	82	91	53	5	ESE	9	.55	
11	64	47	56	100	48	74	49	4	VAR	9	.17	
12	68	44	56	100	46	73	48	3	VAR	9		
13	80	46	63	100	46	73	54	4	VAR	7	.02	
14	82	50	66	100	50	75	58	3	VAR	7		
15	73	54	64	100	73	87	60	3	VAR	5		
16	70	58	64	100	77	89	61	3	VAR	5		
17	64	57	61	100	99	100	61	3	VAR	5	.17	
18	72	56	64	100	74	87	60	3	VAR	7	.54	
19	*74	54	64	100	52	76	56	*4	M	5	.02	
20	73	53	63	100	65	83	58	M	M	M		
21	**63	40	52	100	57	79	46	**6	M	9		
22	55	39	47	100	62	81	42	4	VAR	7	.04	
23	58	37	48	100	58	79	42	5	M	11		
24	59	33	46	100	40	70	37	5	M	9		
25	62	33	48	100	44	72	39	3	SSW	6		
26	55	35	45	100	73	87	41	3	SE	5	1.00	
27	62	50	56	100	84	92	41	4	VAR	7	.16	
28	***54	32	43	100	52	76	37	***6	M	11		
29	63	33	48	100	45	73	40	6	S	11		
30	62	39	51	100	55	78	44	3	VAR	6		
AVE	66	44	55	100	56	78	49	4[1]	VAR[2]	8[1]	3.18	TOTAL

Monthly Max = 82 Peak Gust = 27 MPH NNW 6 September
Monthly Min = 32

* Ave. Speed based on 10 Hrs. 19 Sept.
** Ave. Speed based on 12 hours 21 Sept.
*** Ave. Speed based on 16 hours 28 Sept.

M = Missing
1. 29 days data
2. 24 days data

Table A31

Monthly Meteorological Summary

OCTOBER 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	59	42	50	100	66	90	47	3	VAR	7		
2	60	39	50	100	66	93	48	3	VAR	4		
3	70	41	56	100	52	90	53	M	M	M		
4	70	37	54	100	77	86	50	3	VAR	4		
5	68	35	50	100	37	79	44	3	VAR	7		
6	63	52	56	100	82	95	55	3	VAR	5	.01	
7	71	55	63	100	60	86	59	4	VAR	9		
8	60	51	56	100	89	98	56	3	030	9	.41	
9	68	43	56	100	66	91	53	7	030	18	2.25	
10	47	39	43	73	58	64	32	9	VAR	12		
11	58	25	42	100	49	64	30	5	330	16		
12	55	24	40	100	24	83	35	3	VAR	9		
13	58	29	44	100	59	88	40	3	180	10		
14	47	29	38	100	54	79	32	4	VAR	12	.19	
15	60	27	44	100	47	84	40	3	VAR	9	.06	
16	50	38	44	100	55	69	35	5	210	11	.01	
17	46	28	37	100	53	82	32	3	VAR	7		
18	44	33	38	100	54	71	30	5	330	16		
19	46	29	38	100	42	75	31	3	VAR	6		
20	51	35	43	100	97	100	43	3	VAR	5	1.16	
21	55	44	50	100	56	77	43	8	210	15	.34	
22	47	38	42	71	44	61	30	11	210	18		
23	46	33	40	88	49	68	30	4	270	13		
24	36	24	30	100	81	97	29	M	VAR	M	.28	
25	41	36	38	100	100	100	38	3	360	5	.50	
26	39	25	33	100	65	87	30	4	330	16		
27	43	19	31	88	54	66	21	4	315	14		
28	35	18	26	100	50	75	19	3	210	9		
29	47	26	36	100	57	83	31	3	VAR	11		
30	47	26	36	100	62	92	34	M	M	M		
31	45	36	40	100	79	97	39	M	M	M	.61	
AVG	53	35	44			83	39	4[1]	VAR[2]	10[1]	5.82	

Monthly Max = 71 Peak Gust = 35 mph on 10/22
Monthly Min = 18

M = Missing
1. 27 days data
2. 28 days data

Table A32

Monthly Meteorological Summary

NOVEMBER 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	37	27	32	79	59	67	22	M	M	M	.03	
2	37	25	31	89	42	68	22	M	M	M		
3	41	28	34	100	66	92	32	M	M	M	.20	
4	41	33	37	100	100	100	37	M	M	M	.10	
5	41	30	36	100	86	97	35	M	M	M	.59	
6	40	29	34	100	61	81	29	4	210	11	.01	
7	40	30	35	100	69	82	30	3	VAR	9	.02	
8	30	21	26	100	58	76	20	8	330	13	.04	
9	29	16	22	100	45	68	13	4	315	10		
10	30	19	24	100	89	99	24	3	VAR	5	.07	
11	32	14	23	100	47	74	16	4	VAR	11	.02	
12	34	8	21	100	52	82	16	3	180	8	.04	
13	36	18	27	100	48	78	21	3	VAR	10		
14	41	23	32	100	55	74	25	5	M	14		
15	45	23	34	100	61	87	30	3	M	M		
16	41	18	30	100	M	M	M	3	M	8		
17	50	23	36	M	M	M	M	3	M	12		
18	43	24	34	80	42	66	24	3	VAR	9		
19	47	30	38	78	35	61	26	4	VAR	14		
20	37	21	29	62	37	46	11	7	M	14		
21	34	19	26	64	34	47	9	5	180	10		
22	35	22	28	73	44	53	13	7	180	14		
23	37	31	34	78	50	62	22	4	180	11		
24	36	28	32	78	48	62	20	4	VAR	8		
25	36	21	28	78	40	58	15	M	VAR	M		
26	40	23	32	74	57	66	22	2	VAR	M		
27	56	34	45	79	42	64	34	1	VAR	8	T	
28	47	37	42	79	52	66	32	1	VAR	5	.03	
29	37	20	28	80	51	69	19	M	M	M	.42	
30	25	7	16	75	39	58	4	M	M	M	.01	
AVG	39	24	31	—	—	72[1]	22[1]	4[2]	M	M	1.58 (total)	

Monthly Max = 56
Monthly Min = 7

Peak Gust = 32 mph on 11/20

M = Missing
1. 28 days data
2. 22 days data

Table A33

Monthly Meteorological Summary

DECEMBER 1976

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	25	4	14	95	61	84	10	3	180	6		
2	30	6	18	96	52	82	13	M	M	12		
3	10	-6	2	92	50	65	-7	5	VAR	7		
4	14	-6	4	94	75	89	2	2	045	3	.03	
5	28	11	20	99	70	89	17	1	045	3		
6	28	5	16	97	70	84	12	2	225	4		
7	38	26	32	99	57	90	29	3	330	10	1.12	
8	24	-4	10	87	56	67	1	7	330	13		
9	6	-7	0	91	48	71	-2	4	330	11		
10	36	-6	15	87	63	75	14	2	VAR	4		
11	45	8	26	M	M	M	M	3	315	16		
12	41	7	24	M	M	M	M	1	180	3		
13	33	-8	12	94	59	68	3	6	315	12		
14	24	-12	6	73	42	55	-3	3	180	8		
15	42	16	29	76	41	60	17	2	VAR	5		
16	33	16	24	80	63	73	17	0	CALM	0		
17	33	28	30	80	50	72	22	CALM	VAR	4	.16	
18	28	6	17	77	56	68	8	5	M	13		
19	27	1	14	M	M	M	M	M	M	M		
20	34	14	24	100	82	91	22	2	M	8	.12	
21	32	3	18	100	72	79	13	7	M	10	.05	
22	18	3	10	94	51	73	3	4	M	8		
23	28	7	18	98	66	85	14	2	M	5		
24	26	4	15	95	53	81	10	2	M	8		
25	28	6	17	93	58	79	12	2	M	6	.09	
26	32	5	18	M	M	M	M	2	M	8		
27	18	- 9	4	91	53	64	-5	5	M	14		
28	11	-13	-1	92	60	77	-6	2	M	4	.21	
29	16	10	13	98	90	94	12	4	M	6		
30	17	4	10	90	58	74	3	3	M	10		
31	14	-13	0	94	58	76	-6	2	M	10		
AVG	26	5	16			72[1]	8°F[1]	3[2]	M	8[3]	1.78 TOTAL	

Monthly Max = 45
Monthly Min = -13

Peak Gust = 47 mph on Dec 11

1. 27 days data
2. 29 days data
3. 30 days data

Table A34

Monthly Meteorological Summary

JANUARY 1977

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	19	-7	6	92	72	81	1.5	3	M	9		
2	33	-2	16	M	M	72	8.0	5	M	9		4
3	24	3	14	M	M	M	M	2	M	4	.05	13
4	30	3	16	M	M	M	M	M	M	M	.02	14
5	28	1	10	M	M	M	M	M	M	M		17.5
6	26	-7	10	98	58	82	4.5	3	VAR	6		17
7	28	21	26	100	64	89	23.5	5	045	17	.52	23
8	22	1	12	74	38	58	-0.5	7	030	15		45
9	20	-14	3	95	44	75	-3.0	3	045	8		45
10	25	6	16	100	72	93	14	5	VAR	8	.79	52
11	20	6	13	78	40	56	0.5	8	270	12		51
12	14	-17	-2	94	47	77	-7	3	VAR	9		50
13	14	-21	-4	92	44	73	-10	2	VAR	6		48
14	11	-5	3	91	81	87	0	4	045	6	.02	48
15	24	7	16	98	58	84	11.5	3	VAR	5	.04	47
16	19	6	12	96	42	76	6.5	3	330	7		47
17	4	-19	-8	87	48	64	-16.5	4	330	8		47
18	5	-30	-12	88	47	73	-19	5	360	8		46
19	24	-15	4	98	46	77	- 1	3	060	5		45
20	32	- 6	13	97	48	73	6	3	VAR	8		44
21	27	0	14	100	44	78	8	3	060	9		44
22	10	- 6	2	96	49	67	- 6.5	8	030	14		43
23	21	1	11	94	54	71	3.5	4	060	6		42
24	29	1	15	100	50	80	10	2	VAR	4		42
25	32	22	27	100	72	92	25	3	VAR	4	.12	45
26	28	5	16	100	48	80	11.5	M	M	M	.02	45
27	23	2	12	96	38	66	3.5	7	225	15		48
28	22	-16	3	98	40	70	- 4.5	5	210	8	.17	49
29	10	- 1	4.5	68	42	53	- 9.	8	225	10		48
30	13	-14	0	M	M	M	M	6	225	12		48
31	16	- 3	6	M	M	M	M	8	225	12		40
AVG	21	- 3	9			M	M	5[1]	VAR[2]	9[1]	1.75	in TOTAL

Monthly max = 33 Peak Gust = 29 mph on Jan 27
Monthly Min = -30

M = Missing
1. 28 days data
2. 25 days data

Table A35

Monthly Meteorological Summary

FEBRUARY 1977

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	21	- 5	8	96	38	65	- 1.5	5	330	12		40
2	19	-11	4	95	32	63	- 6	5	030	12		40
3	23	-11	6	100	60	89	3.5	3	VAR	4	.09	43
4	29	9	19	99	43	71	11.5	4	VAR	8		45
5	25	10	18	100	70	88	14.5	5	060	8	.06	42
6	20	5	12	76	47	60	1.5	7	360	8		43
7	19	- 2	8	95	48	69	0.5	6	030	10		47
8	27	-11	8	99	37	75	2	3	VAR	9		42
9	32	- 3	14	99	34	72	7.5	4	210	7	T	42
10	33	10	22	100	48	77	15.5	4	045	7		41
11	38	10	24	98	56	79	18.5	3	VAR	5		40
12	41	32	36	91	52	73	29	3	VAR	7		39
13	35	31	33	100	86	97	32	3	180	6	.15	36
14	39	25	32	99	39	70	23.5	5	228	11	.02	36
15	33	17	25	94	44	67	16	4	330	9		34
16	21	3	12	77	46	61	1.5	7	045	10		35
17	19	- 8	6	95	48	74	- 1	5	045	10		35
18	31	4	18	100	38	73	10.5	2	VAR	6		35
19	32	8	20	100	61	86	16.5	2	VAR	5		29
20	28	10	19	100	99	98	18.5	3	060	5	.28	29
21	29	10	20	84	42	61	8.5	7	330	12		47
22	30	- 5	12	96	47	76	6.5	4	VAR	11		43
23	31	21	26	88	34	58	13.5	5	060	9		41
24	30	22	26	99	58	77	20	6	210	8		43
25	39	29	34	100	55	80	28	6	270	9	1.13	42
26	40	25	32	99	42	65	22	5	270	13		38
27	40	26	33	100	62	78	27	6	225	10	.22	38
28	39	29	34	100	36	58	21	6	270	10		36
AVG	30	10	20			74	14	5	360/225	9	1.95	TOTAL

Monthly Max = 41 Peak Gust = 28 mph on Feb 26
Monthly Min = -11

Table A36

Monthly Meteorological Summary

MARCH 1977

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	32	22	27	87	40	55	13.5	7	240	12		35
2	35	12	24	92	42	56	10.5	6	270	10		35
3	41	20	30	100	38	63	19.5	5	270	9		33
4	33	16	24	100	67	91	23.5	3	VAR	5	.85	33
5	44	31	38	100	53	82	33	3	225	6		39
6	38	34	36	69	52	58	23	5	240	8		32
7	37	30	34	77	49	70	25	2	VAR	6		27
8	45	25	35	100	34	60	22.5	5	360	8		27
9	57	20	38	100	29	63	27.5	2	VAR	7		28
10	63	29	46	100	33	69	36.5	4	VAR	16		20
11	63	25	44	100	31	75	36.5	2	VAR	4		19
12	62	25	44	100	36	65	32.5	M	M	M	.02	10
13	51	36	44	100	84	95	42.0	4	VAR	7	1.06	T
14	56	38	44	100	74	88	41.0	5	060	8	.14	0
15	48	35	42	100	62	86	37.5	3	VAR	4	.09	0
16	42	33	38	100	43	74	30.5	5	045	10		0
17	35	27	31	81	37	48	14.0	9	360	15		0
18	27	22	24	96	40	70	16.5	6	045	8	.43	0
19	37	17	27	79	20	42	7.5	8	030	15	.19	13
20	44	5	24	100	21	68	15.5	3	VAR	8	.02	5
21	45	25	35	100	34	76	28.5	1	VAR	5	.09	8
22	43	19	31	100	35	76	24.5	5	090	10	.17	4
23	35	30	32	97	57	75	25.5	7	360	10	.39	19
24	35	26	30	69	53	58	18.0	8	330	12		16
25	27	19	23	83	45	57	10.0	8	030	12		16
26	43	22	32	97	40	62	21.0	4	045	10		4
27	56	19	38	98	24	68	28.0	1	VAR	2		2
28	60	27	44	100	33	72	35.0	2	225	6		0
29	71	39	55	100	42	84	50.5	2	VAR	4	.36	0
30	80	35	58	100	21	64	46.0	1	VAR	2	.04	0
31	62	37	50	94	40	64	38.0	M	360	M	.20	0
AVG	46	26	36			69	27.0	4	VAR/045	8	4.05 TOTAL	

Monthly Max = 80 Peak Gust = 30 mph on Mar 17
Monthly Min = 5

Table A37

Monthly Meteorological Summary

APRIL 1977

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	44	24	34	78	16	63	23.0	M	360	M		
2	43	24	34	93	24	64	23.0	4	180	9	.11	
3	57	31	44	96	15	46	19.5	M	M	M		
4	45	27	36	55	22	35	11.5	3	90	10		
5	37	32	34	100	57	90	32.0	5	180	13	.88	
6	43	30	36	80	23	37	13.0	M	M	M		
7	37	23	30	71	25	43	10.5	4	270	7		
8	35	20	28	96	35	56	14.0	5	315	11	.05	
9	35	15	25	94	29	46	7.5	4	360	7		
10	47	19	33	96	18	47	15.5	5	030	12		
11	59	20	39	93	25	46	21.0	3	225	9		
12	73	36	54	100	29	60	41.0	2	VAR	8		
13	82	34	58	100	24	59	44.0	4	225	11	.10	
14	49	33	41	100	35	54	25.5	6	360	14		
15	51	27	39	93	32	50	22.0	4	360	13		
16	57	25	41	94	28	52	25.0	5	360	12		
17	65	31	48	100	27	57	33.5	1	VAR	5		
18	70	29	50	100	29	62	37.0	M	M	M		
19	76	29	42	100	22	54	27.0	3	VAR	10		
20	73	29	51	100	30	58	37.0	3	220	10		
21	83	44	64	100	36	66	52.0	3	220	8		
22	80	49	64	100	47	77	57.0	3	VAR	6		
23	60	42	51	100	92	100	51.0	3	030	10	1.24	
24	42	37	40	100	87	98	39.0	4	050	6	.54	
25	44	37	40	100	83	97	39.5	1	VAR	3	.11	
26	55	40	48	100	53	84	43.5	1	VAR	4		
27	59	38	48	100	44	78	41.0	3	200	8	.03	
28	58	31	44	100	40	65	33.5	M	M	M		
29	50	25	38	80	30	43	17.5	8	300	12		
30	67	26	46	100	24	61	34.0	3	VAR	8		
AVG	55	30	43			62	30	3	170	9	3.25 TOTAL	

Monthly Max = 83 Peak Gust = 35 mph on Apr 13
Monthly Min = 15

Table A38

Monthly Meteorological Summary

MAY 1977

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	74	28	51	100	21	60	37.5	M	M	M		
2	68	47	58	100	45	68	47.5	M	M	M	.08	
3	56	34	45	100	31	58	31.0	7	330	11	.01	
4	70	24	47	100	18	62	34.5	2	VAR	6		
5	74	34	54	100	40	73	46.0	5	220	8	.04	
6	86	51	68	100	26	63	55.5	6	210	12	.01	
7	57	32	44	98	30	52	28.0	8	330	12		
8	56	25	40	100	28	59	27.5	4	250	10		
9	46	34	40	100	47	83	35.5	9	020	16	.15	
10	50	38	44	100	42	69	34.5	9	340	15	.10	
11	63	37	50	100	34	66	39.0	7	350	12		
12	72	31	52	100	26	58	37.5	M	M	M		
13	57	41	49	100	32	53	32.5	M	M	M		
14	55	34	44	94	32	47	25.5	8	330	12		
15	66	27	46	100	20	58	32.0	4	VAR	9		
16	85	30	58	100	24	61	44.5	3	VAR	6		
17	92	43	68	100	32	66	56.0	3	VAR	8		
18	84	51	68	100	32	67	56.0	M	M	M	1.01	
19	78	49	63	100	42	75	55.0	M	M	M	.06	
20	88	49	67	100	39	77	59.5	2	VAR	5		
21	91	49	70	100	41	73	61.0	3	220	7		
22	96	57	76	100	31	71	66.5	3	220	7		
23	92	57	74	100	33	72	65.0	3	VAR	6		
24	94	54	74	100	43	80	67.5	2	VAR	5		
25	86	59	72	100	35	66	60.5	5	340	10		
26	74	49	62	100	25	53	44.5	7	340	10		
27	71	43	57	99	35	64	45.0	5	340	14		
28	70	43	56	100	69	90	54.0	4	VAR	11	.09	
29	71	40	56	100	40	74	47.5	4	040	8		
30	77	41	59	100	32	79	52.5	2	VAR	5		
31	85	42	64	100	30	68	54.0	2	VAR	6		
AVG	73	41	57			68	46	5	VAR	9	1.55	TOTAL

Monthly Max = 96 Peak Gust = Missing
Monthly Min = 24

Table A39

Monthly Meteorological Summary

JUNE 1977

Date	Temperature (°F) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°F)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation (in) Amt.	Snow Depth
1	67	48	58	100	62	92	55.5	4	240	9	.21	
2	80	56	68	100	58	95	66.5	2	240	8	.81	
3	57	45	51	100	40	72	42.5	7	360	13		
4	75	42	58	100	29	64	46.5	5	010	12		
5	68	51	60	100	60	83	54.5	5	360	10		
6	69	44	56	100	47	85	52.0	3	030	6	1.00	
7	57	47	52	100	81	97	51.0	2	040	6	.70	
8	53	42	48	100	65	86	43.5	4	230	8	.03	
9	65	37	51	100	44	83	46.0	3	VAR	11		
10	63	48	56	100	67	91	53.0	6	030	10	.21	
11	59	51	55	100	77	91	52.5	5	020	10	.03	
12	66	53	60	100	72	92	57.5	3	030	8		
13	79	53	66	100	51	80	59.5	2	020	7		
14	79	51	65	100	52	87	61.0	1	VAR	5	.22	
15	76	45	60	100	29	71	51.5	4	360	11		
16	80	39	60	100	27	75	52.0	2	VAR	5		
17	69	47	58	100	54	85	53.5	3	230	9	.01	
18	81	57	69	100	49	90	66.0	3	210	5	.09	
19	80	55	68	100	39	71	58.0	4	M	8	.05	
20	82	52	67	100	38	74	58.5	4	270	6	.06	
21	74	50	62	100	52	85	57.5	3	VAR	8	.06	
22	64	45	54	100	53	83	49.5	4	020	10		
23	72	47	60	100	51	81	54.0	2	070	6		
24	81	47	64	100	38	74	55.5	3	230	8		
25	72	60	66	100	72	87	62.0	4	250	7	.68	
26	71	59	65	100	74	97	64.0	2	VAR	5	.35	
27	88	59	74	100	49	84	68.5	2	270	4	.02	
28	88	59	74	100	48	80	67.0	5	230	8		
29	75	63	69	100	57	89	65.5	5	230	8	.97	
30	81	59	70	100	37	59	55.0	6	VAR	9		
AVG	72	50	61			83	56.0	4	170	8	5.50	TOTAL

Monthly Max = 88 Peak Gust = 26 mph on June 2
Monthly Min = 37

Table A40

Monthly Meteorological Summary

JULY 1977 *

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed (MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	30	14	22	100	32	77	18.0	4	250	10	.50	
2	23	10	16	100	43	70	10.5	3	VAR	M		
3	26	8	17	100	37	74	12.5	3	240	M	.55	
4	29	13	21	100	57	89	19.0	3	VAR	8	.60	
5	29	13	21	100	31	70	15.5	5	340	12		
6	22	7	14	100	40	74	9.5	3	VAR	7		
7	26	6	16	100	29	75	11.5	2	VAR	4		
8	16	12	14	100	93	100	14.0	2	VAR	7	7.35	
9	29	14	22	100	50	83	18.5	4	320	8		
10	26	10	18	100	37	71	12.0	3	050	8		
11	26	8	17	100	42	78	13.0	3	230	7		
12	19	14	17	100	83	98	16.0	1	250	4	2.77	
13	31	19	25	100	36	84	22.0	4	220	8	.25	
14	27	15	21	100	38	72	16.0	4	360	10		
15	31	14	23	100	29	69	16.5	3	230	8		
16	32	18	25	100	45	78	21.0	2	VAR	5		
17	30	21	25	100	49	87	22.5	3	VAR	8	T	
18	30	17	23	100	31	73	18.0	3	360	8	1.5	
19	33	15	24	100	39	76	19.5	3	240	8		
20	35	20	27	100	35	70	21.0	4	230	8		
21	35	18	26	100	39	84	23.0	3	240	11	8.2	
22	19	9	14	100	34	62	7.0	7	360	16		
23	25	8	16	100	27	62	9.0	5	360	10		
24	29	13	21	100	31	66	14.0	5	240	4		
25	23	13	18	100	62	90	16.5	4	M	M	3.0	
26	20	8	14	100	27	64	7.0	3	M	M		
27	23	6	14	100	25	65	7.5	4	350	10		
28	26	7	16	100	23	65	9.5	3	220	8		
29	26	11	18	100	37	66	11.5	5	210	10		
30	24	16	20	100	67	88	17.5	3	240	7		
31	29	13	21	100	30	73	16.0	3	VAR	7		
AVG	26	12	19			76	15.0	3	260	8	24.72	TOTAL

Monthly Max = 35 Peak Gust = 42 mph on July 21
Monthly Min = 6

*Temps and Precip. in metric units - temperatures rounded up to nearest degree

Table A41

Monthly Meteorological Summary

AUGUST 1977

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed (MPH)	Dir.	Max-Hrly	Precipitation Amt. (cm)	Snow Depth (mm)
1	24	15	20	100	68	94	18.5	3	240	7	4.75	
2	29	16	22	100	30	73	17.0	3	250	7		
3	28	14	21	100	33	79	17.0	3	220	8		
4	31	16	23	100	35	76	18.0	4	230	8		
5	30	18	24	100	49	84	20.5	4	230	8	1.50	
6	26	18	22	100	60	94	21.0	2	240	8	2.50	
7	27	19	23	100	61	89	21.0	1	VAR	4	.25	
8	28	18	23	100	60	90	21.0	2	240	6		
9	26	11	18	100	24	60	10.0	5	340	10		
10	20	9	15	100	56	93	13.0	2	VAR	4	16.15	
11	30	18	24	100	42	81	20.0	2	VAR	7		
12	25	15	20	100	60	92	18.5	2	VAR	6	3.97	
13	26	14	20	100	40	79	16.5	5	220	9		
14	27	16	22	100	66	90	20.0	4	220	9	7.11	
15	26	12	19	100	28	71	14.5	2	VAR	7		
16	24	12	18	100	38	83	15.5	2	VAR	5	6.85	
17	26	13	19	100	50	82	15.5	5	240	8	.25	
18	22	9	16	100	32	69	10.0	5	M	M		
19	23	8	15	100	30	73	10.0	3	VAR	7		
20	20	7	14	100	33	75	9.0	5	VAR	11		
21	24	6	15	100	28	73	9.5	3	VAR	7		
22	23	10	17	100	54	89	15.0	5	M	8	2.28	
23	24	7	16	100	41	79	12.0	4	M	9		
24	17	10	13	100	88	98	13.0	4	050	8	1.78	
25	19	7	13	100	33	74	8.5	5	VAR	12		
26	23	6	15	100	30	74	10.0	3	220	6		
27	27	9	18	100	48	82	14.5	4	240	9		
28	33	17	25	100	43	79	21.0	3	250	8		
29	33	20	22	100	32	76	17.0	4	230	9		
30	25	13	19	100	47	83	15.5	4	070	8		
31	22	12	17	100	57	81	13.5	3	VAR	8		
AVG	25	13	19			81	15.4	3	VAR/220	8	47.39	TOTAL

Monthly Max = 33 Peak Gust = 24 mph on Aug 9
Monthly Min = 6

Table A42

Monthly Meteorological Summary

SEPTEMBER 1977

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	29	19	24	100	52	80	20.0	M	M	M		
2	29	19	24	100	42	80	20.0	4	220	7		
3	26	12	19	100	37	78	14.5	3	VAR	10	0.25	
4	25	10	18	100	30	73	12.5	3	VAR	7		
5	22	12	17	100	60	91	15.5	3	230	8	0.25	
6	21	11	16	100	39	75	11.5	4	VAR	10		
7	21	8	15	100	23	68	8.5	3	VAR	8		
8	22	7	15	100	24	71	9.5	3	VAR	7		
9	22	7	15	100	43	72	9.5	5	200	10		
10	24	13	19	100	39	74	14.0	3	230	7	0.51	
11	18	6	12	100	33	66	6.0	6	360	12		
12	21	4	13	100	28	75	8.5	3	VAR	7	0.25	
13	15	11	13	100	85	99	12.5	2	VAR	5	11.25	
14	22	11	16	100	43	79	12.5	6	240	10	26.00	
15	20	6	13	100	43	76	9.0	4	050	8		
16	17	7	12	100	66	94	10.5	2	240	5	4.25	
17	16	12	14	100	91	98	13.0	1	VAR	3	3.50	
18	25	18	20	100	54	90	18.5	1	VAR	4		
19	24	13	19	100	52	90	17.0	3	050	5	2.25	
20	14	5	10	100	64	90	8.0	4	080	7	27.25	
21	11	6	9	100	80	95	8.0	3	050	6	3.25	
22	13	6	9	100	63	88	7.0	2	050	5		
23	16	6	11	100	52	89	8.0	2	050	5		
24	11	8	10	100	78	90	8.0	3	190	5	2.00	
25	11	6	8	100	61	74	4.0	6	170	8		
26	17	9	13	100	82	97	12.0	5	230	7	14.60	
27	19	9	14	100	52	82	10.5	4	230	9	0.25	
28	19	7	13	100	59	92	11.0	2	VAR	3	2.00	
29	15	5	10	100	47	78	6.5	6	020	8	4.75	
30	13	3	8	100	67	94	6.5	4	210	5	4.00	
AVG	19	9	14			83	11.0	3	VAR	7	106.61	TOTAL

Monthly Max = 29
Monthly Min = 3

Peak Gust = 28 mph on September 14

Table A43

Monthly Meteorological Summary

OCTOBER 1977

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	16	10	13	100	82	98	12.0	3	VAR	7	43.35	
2	16	10	13	100	72	91	11.5	4	030	7	0.75	
3	10	6	8	94	61	78	4.0	6	360	8		
4	14	2	8	100	35	74	3.5	4	340	10		
5	20	1	11	100	31	77	6.5	4	230	8		
6	17	2	9	100	27	76	5.0	4	230	9	0.50	
7	10	-2	4	100	32	72	- 0.5	5	020	10		
8	9	-5	2	100	42	77	- 2.0	4	200	8	3.55	
9	16	6	11	100	76	91	9.0	5	240	8	36.40	
10	11	5	8	100	60	81	4.5	3	270	5	0.25	
11	16	2	9	100	43	78	5.5	4	VAR	6		
12	13	4	9	100	40	79	5.0	3	VAR	9		
13	9	-1	5	100	52	79	1.0	4	VAR	9		
14	5	-2	2	100	66	94	1.0	5	050	7	4.30	
15	7	0	4	100	66	93	2.5	4	360	7	5.56	
16	14	-1	7	100	58	89	5.0	4	VAR	9	1.25	
17	11	4	7	99	70	90	5.5	6	300	12	45.25	
18	14	3	8	97	29	70	3.0	3	240	7		
19	10	5	7	99	71	91	5.5	3	060	6		
20	10	7	8	100	67	79	4.5	7	030	11		
21	17	1	9	100	34	74	4.5	3	250	7		
22	14	2	8	100	45	79	4.0	4	VAR	8	0.70	
23	9	-5	2	100	32	60	- 5.0	5	360	10		
24	14	-6	4	100	29	78	0.5	2	VAR	4		
25	20	-3	9	100	39	80	5.5	1	VAR	3		
26	21	6	7	100	45	76	2.5	4	220	10		
27	23	5	14	100	40	84	11.0	2	VAR	7		
28	16	1	8	100	45	81	5.0	3	010	10		
29	M	-3	M	100	M	M	M	2	VAR	7		
30	M	M	M	100	33	M	M	3	070	9		
31	14	-6	4	100	M	M	M	1	VAR	6		
AVG	13	1	7			81	4.4	4	VAR	8	141.86	TOTAL

Monthly Max = 23
Monthly Min = -6

Peak Gust = 26 mph on Oct 4

Table A44

Monthly Meteorological Summary

NOVEMBER 1977

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	19	- 7	6	100	32	87	4.0	2	240	7		
2	18	- 2	8	100	51	90	6.5	1	VAR	4		
3	16	1	8	100	53	83	5.5	2	230	6		
4	12	8	10	94	56	77	5.5	2	240	7	1.00	
5	12	7	9	100	70	91	7.5	3	040	7	0.25	
6	M	M	M	100	M	M	M	3	230	5	0.75	
7	10	M	M	100	41	M	M	5	100	8	2.80	
8	9	4	6	100	77	91	4.5	5	070	8	4.10	
9	13	8	10	100	88	99	10.0	2	VAR	5	0.30	
10	16	10	13	100	90	99	12.5	3	190	7	7.20	
11	17	1	9	100	52	70	4.0	7	230	10	19.20	
12	7	- 3	2	100	38	76	- 2.0	2	210	5		
13	2	- 1	1	99	68	80	- 2.0	7	360	11		
14	- 1	- 8	- 4	85	40	58	-11.0	5	330	8		
15	1	-10	- 4	100	58	88	- 5.5	1	VAR	3		
16	16	- 2	7	100	48	82	4.0	3	VAR	8		
17	16	6	11	100	76	93	10.0	2	VAR	9	6.40	
18	9	2	5	100	46	79	1.5	6	220	10	1.35	
19	7	- 1	3	96	41	59	- 4.0	6	320	9		
20	6	- 3	2	97	45	71	- 5.0	3	010	8		
21	8	1	4	100	52	80	2.0	3	VAR	6		
22	7	- 1	3	100	38	64	- 3.0	3	VAR	8		
23	5	- 3	1	100	40	78	- 2.5	4	210	8	3.90	
24	8	3	5	100	57	92	4.0	3	240	6	3.70	
25	7	- 2	3	100	45	79	- 1.0	3	VAR	5		
26	7	- 2	2	100	74	93	1.0	6	VAR	13	15.50	
27	- 3	- 9	- 6	78	38	53	-14.0	6	290	9		
28	0	- 7	- 3	100	67	91	- 4.5	2	VAR	3	2.20	
29	3	- 6	- 2	100	55	85	- 3.5	2	VAR	4		
30	1	- 7	- 3	100	75	93	- 4.0	2	VAR	5	4.50	
AVG	8	-0.3	4			81	1.0	4	VAR	7	73.15	TOTAL

Monthly Max = 19 Peak Gust = 27 mph on Nov 17
Monthly Min = -10

Table A45

Monthly Meteorological Summary

DECEMBER 1977

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	7	2	4	100	87	94	3.0	5	220	11	14.6	2
2	11	0	6	100	41	64	- 1.0	6	230	14		
3	8	2	5	99	43	57	- 3.5	7	230	10		
4	5	- 3	1	100	38	66	- 4.5	5	270	8		
5	- 2	- 7	- 4	100	60	89	- 5.5	4	040	7		
6	- 1	- 4	- 2	100	98	100	- 2.0	M	M	M	8.75	25
7	- 3	-18	-11	M	54	M	M	M	M	M	1.25	31
8	- 5	-16	-10	M	M	M	M	2	VAR	6		33
9	- 1	-13	- 7	100	M	M	M	5	230	10	6.50	25
10	- 5	-16	-11	81	37	55	-18.0	7	330	9		28
11	-22	-28	-25	M	M	M	M	4	VAR	10		25
12	-15	-29	-22	M	M	M	M	3	VAR	7	0.75	22
13	- 6	-16	-11	M	M	M	M	4	VAR	7	0.50	20
14	3	- 7	- 2	100	96	99	- 2.0	5	240	9	17.75	27.5
15	5	2	4	100	73	88	- 5.0	5	010	12	4.75	30
16	5	2	3	90	57	69	- 2.0	6	360	11		26
17	2	- 9	- 4	100	50	70	- 8.0	6	040	9		22.5
18	4	-14	- 5	100	62	85	- 7.0	3	VAR	7		22
19	4	- 2	1	86	66	74	- 3.0	6	060	9		20
20	0	- 4	- 2	98	73	81	- 4.5	4	060	7		19
21	4	- 3	1	100	80	90	- 0.5	4	330	7	5.25	22
22	4	- 2	1	100	50	77	- 2.5	4	230	9		26
23	5	- 3	1	88	48	69	- 4.0	5	220	8		25
24	8	- 9	1	100	46	86	- 1.5	1	VAR	3		24
25	6	- 4	1	100	54	88	- 1.0	3	VAR	7	8.00	21
26	8	-11	2	100	M	M	M	5	300	7		19
27	- 5	-22	-13	M	M	M	M	1	VAR	5		19
28	- 6	-22	-14	M	M	M	M	C	CALM	2		17
29	- 5	-21	-13	M	M	M	M	2	VAR	7		17
30	- 4	-18	-11	M	M	M	M	1	VAR	3		17
31	1	-15	8	M	M	M	M	5	050	8		17
AVG	0	- 9	- 5			M	M	4	VAR	7	68.10	TOTAL

Monthly Max = 11 Peak Gust = 29 mph on Dec 2 and 9
Monthly Min = -29

Table A46

Monthly Meteorological Summary

JANUARY 1978

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	- 1	-20	-10	M	M	M	M	1	180	5		17
2	- 5	-21	-13	M	M	M	M	2	270	6		20
3	- 6	-23	-14	M	M	M	M	5	240	8		21
4	- 6	-21	-14	M	M	M	M	CALM	VAR	2		21
5	1	-13	- 6	100	64	90	- 7.5	1	250	5		17
6	- 2	- 7	- 5	100	60	82	- 7.0	7	050	9		17.5
7	- 4	- 8	- 6	100	85	94	- 6.5	6	140	8		18.5
8	4	- 7	- 2	100	100	100	- 1.5	5	240	7	13.75	19
9	5	-13	- 5	100	69	84	- 6.0	9	250	15	22.30	13
10	-13	-19	-16	97	57	83	-18.0	9	270	16	0.30	14
11	- 6	-19	-12	100	53	80	-15.0	7	230	10		15
12	- 6	-18	-12	100	50	84	-14.5	5	060	8		16
13	- 9	-18	-13	100	95	99	-13.0	5	040	9	0.30	15
14	- 4	- 9	- 6	100	99	100	- 6.0	5	050	8	13.40	37
15	- 6	-16	-11	100	82	95	-11.5	3	010	7	0.20	37
16	- 5	-15	-10	100	62	81	-12.5	4	240	8		36
17	- 9	-17	-13	100	84	97	-13.0	4	060	7	0.80	36
18	- 6	-13	- 9	100	80	95	- 9.5	6	010	10	8.30	42
19	- 6	-15	-10	100	75	93	-11.0	2	070	4		43
20	-11	-12	-11	100	80	96	-11.5	6	040	9	9.30	41
21	- 8	-12	-10	100	84	97	-10.0	3	340	6	8.70	53
22	0	-21	-10	100	62	93	-11.0	CALM	VAR	3	0.70	62
23	1	-20	-10	100	58	91	-10.5	2	VAR	6		59
24	2	-23	-11	100	54	92	-11.5	1	VAR	3		57
25	1	- 6	- 3	100	88	99	- 2.5	1	VAR	3	12.00	56
26	12	- 3	5	100	43	77	1.0	10	210	20	19.70	65
27	- 3	- 8	- 5	100	59	77	- 3.5	9	220	13		35
28	- 5	-12	- 9	88	55	71	-13.0	5	270	7		31
29	- 9	-20	-14	100	58	84	-16.0	3	VAR	7		31
30	- 8	-17	-13	100	67	92	-13.5	3	030	8		31
31	- 4	-19	-12	100	53	82	-14.0	3	VAR	7		37
AVG	- 4	-15	- 9			89	-10.0	4	147	7.9	109.75	TOTAL

Monthly Max = 12 Peak Gust = 40 mph on Jan 26
Monthly Min = -23

Table A47

Monthly Meteorological Summary

FEBRUARY 1978

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	- 5	-22	-13	100	59	85	-15.0	3	VAR	8		37
2	- 6	-22	-14	100	55	88	-15.0	1	VAR	6		36
3	-12	-25	-19	100	47	77	-21.5	4	030	11		34
4	-12	-29	-20	100	42	76	-23.0	4	030	8		33
5	-10	-29	-19	100	44	78	-22.0	1	VAR	4		38
6	- 6	-16	-11	100	49	77	-14.0	7	050	9	2.5	38
7	- 4	- 7	- 6	100	100	100	- 5.5	9	030	11	16.75	M
8	- 3	-21	-12	100	51	87	-14.0	5	030	10		75
9	2	-28	-13	100	37	84	-15.0	1	VAR	4		68
10	- 4	-26	-15	100	48	87	-16.5	1	CALM	4		66
11	- 2	-29	-15	100	51	87	-16.5	1	M	4		56
12	0	-21	-10	100	55	87	-12.0	1	M	4		55
13	- 2	-15	- 8	100	43	82	-10.5	3	VAR	6		54
14	- 2	-17	- 9	100	52	86	-11.0	2	VAR	5		54
15	- 3	-22	-12	100	49	85	-14.0	1	VAR	5		54
16	- 1	-22	-11	100	43	82	-13.5	CALM	VAR	2		54
17	2	-11	- 6	100	59	86	- 8.0	2	VAR	5		52
18	1	-16	- 8	100	58	92	- 9.0	2	VAR	7		52
19	- 3	-19	-11	100	37	75	-14.0	3	VAR	9	.37	51
20	1	-25	-12	100	39	87	-14.0	1	VAR	6		51
21	- 1	-18	- 9	100	50	82	-11.5	2	VAR	8		50
22	- 2	-24	-13	100	57	84	-15.5	4	030	9		50
23	4	-17	- 6	100	41	67	-11.0	4	320	12		50
24	2	-10	- 4	100	55	80	- 7.0	3	VAR	8		53
25	5	-15	- 5	100	44	73	- 9.5	3	VAR	8		53
26	4	-15	- 5	100	47	79	- 8.0	3	VAR	10		53
27	0	-13	- 6	100	54	77	- 9.5	6	010	11		53
28	- 2	-20	-11	100	45	78	-14.0	3	VAR	12		53
AVG	- 2	-20	-11			82	-13.2	3	VAR	7	19.62	45

Monthly Max = 5 Peak Gust = 27 mph on Feb 27
Monthly Min = -29

Table A48

MARCH 1978

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	- 3	-22	-12	100	42	74	-16.0	M	M	M		53
2	- 5	-24	-14	100	41	76	-17.5	M	M	M		53
3	- 3	-22	-12	100	47	90	-13.5	CALM	VAR	3	1.50	55
4	- 3	-12	- 8	100	55	82	-10.0	5	330	14	1.90	56
5	- 6	-18	-12	100	44	66	-16.5	6	330	11		55
6	1	-19	- 9	100	35	57	-16.0	6	330	11		55
7	- 1	-13	- 7	100	48	58	-13.5	7	360	11		51
8	6	-21	- 8	100	39	77	-11.0	CALM	VAR	2		53
9	8	-18	- 5	100	32	69	-10.0	1	220	5		50
10	7	-12	- 3	100	41	77	- 6.0	2	060	6		49
11	11	-11	0	100	41	74	- 4.0	2	220	4		47
12	10	- 3	4	100	58	85	1.0	2	250	6		44
13	10	- 7	2	100	25	70	- 3.5	M	M	M		40
14	2	- 5	- 2	100	62	92	- 3.0	M	M	M	13.0	40
15	5	- 5	1	100	72	85	- 1.5	4	270	6		37
16	0	- 8	- 4	100	48	68	- 9.0	4	060	6		35
17	0	-13	- 7	100	38	63	-12.5	2	330	7		34
18	2	-17	- 8	100	37	66	-13.0	4	240	7		35
19	7	- 5	1	100	48	76	- 3.0	8	240	12		30
20	2	- 9	- 4	90	24	46	-13.5	2	VAR	4		33
21	12	- 9	2	100	61	87	- 0.5	3	230	8		33
22	4	- 3	1	100	54	79	- 2.5	3	270	8		28
23	9	- 4	3	100	43	79	- 0.5	2	VAR	7	4.00	30
24	3	- 8	- 3	100	32	56	-10.0	6	350	11		24
25	3	-12	- 5	87	31	55	-12.0	2	VAR	5		25
26	1	- 3	- 1	100	60	85	- 3.5	3	VAR	5	2.60	24
27	4	- 1	2	100	97	100	2.0	2	220	6	7.30	29
28	8	1	4	100	50	79	0.5	3	250	6		23
29	8	0	4	100	46	68	- 1.5	4	260	10		18
30	5	- 5	0	100	44	73	- 4.0	4	030	9		15
31	7	- 6	1	100	46	79	- 2.5	2	360	5		5
AVG	6	-10	- 3			74	- 7.5	3	VAR	7	30.3	TOTAL

Monthly Max = 12 Peak Gust = 36 mph on March 19
Monthly Min = -24

Table A49

APRIL 1978

Date	Temperature (°C) Max	Min	Avg	Rel. Hum. % Max	Min	Mean	Dew Point Mean (°C)	Wind Speed(MPH)	Dir.	Max-Hrly	Precipitation Amt. (mm)	Snow Depth (cm)
1	7	- 3	2	100	56	91	0.5	2	VAR	8	11.80	
2	4	- 5	0	100	40	54	- 8.0	9	350	14		
3	6	- 8	- 2	82	28	49	-11.5	2	VAR	5		
4	2	0	1	100	62	89	- 0.5	4	220	6	2.50	
5	6	1	3	100	55	78	- 0.5	3	VAR	10	7.10	
6	8	- 4	2	100	34	60	- 5.0	5	010	10		
7	2	- 4	- 1	100	62	98	- 1.5	0	VAR	4	2.90	
8	4	- 3	1	100	66	78	- 2.5	5	010	10	0.80	
9	5	- 5	0	92	49	66	- 5.5	5	020	10		
10	12	0	6	100	M	M	M	2	VAR	5		
11	5	- 1	2	100	87	M	M	M	M	M	11.50	
12	12	0	6	100	35	71	1.0	M	M	M	0.20	
13	19	- 1	9	100	32	61	2.0	2	VAR	6		
14	7	1	4	70	54	61	- 3.0	6	300	11		
15	6	- 1	3	100	50	73	- 1.5	5	330	9		
16	8	- 2	3	100	40	74	- 1.0	2	VAR	6		
17	10	- 2	4	100	40	78	0.5	2	VAR	8		
18	15	- 3	6	100	27	70	1.0	1	VAR	3		
19	10	- 2	4	100	44	84	1.5	4	160	10	11.60	
20	8	4	6	100	98	100	6.0	1	VAR	4	3.90	
21	7	4	6	100	69	89	4.0	2	240	5	0.70	
22	12	- 2	5	100	28	61	- 2.0	5	330	11		
23	13	- 4	5	100	23	53	- 3.5	5	350	13		
24	15	- 3	6	100	33	72	1.5	4	360	11		
25	11	- 1	5	100	45	72	0.5	5	020	11		
26	17	- 3	7	100	25	56	- 1.0	3	020	8		
27	18	- 1	9	100	32	65	2.5	3	050	9		
28	16	- 1	8	100	32	60	0.5	4	040	10		
29	18	- 2	8	100	24	57	0	2	350	4		
30	5	- 2	2	75	43	54	- 7.0	3	330	5		
AVG	10	- 2	4			71	- 1.1	3	VAR	7	53.00	TOTAL

Monthly Max = 19 Peak Gust = 34 mph on Apr 2
Monthly Min = - 8

Appendix B: The following figures illustrate the changes in test cell 5 soil temperature with depth. The data were taken every 4 hours and each figure contains one month data extending from September 1976 to April 1978.

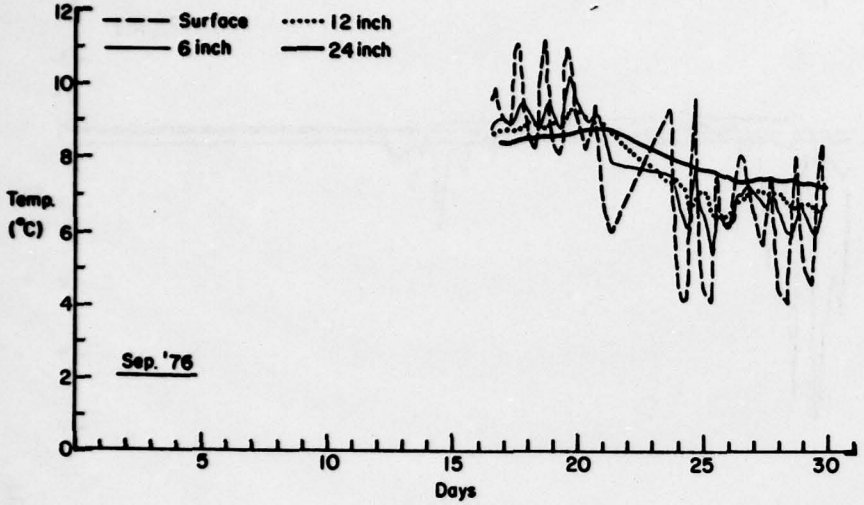
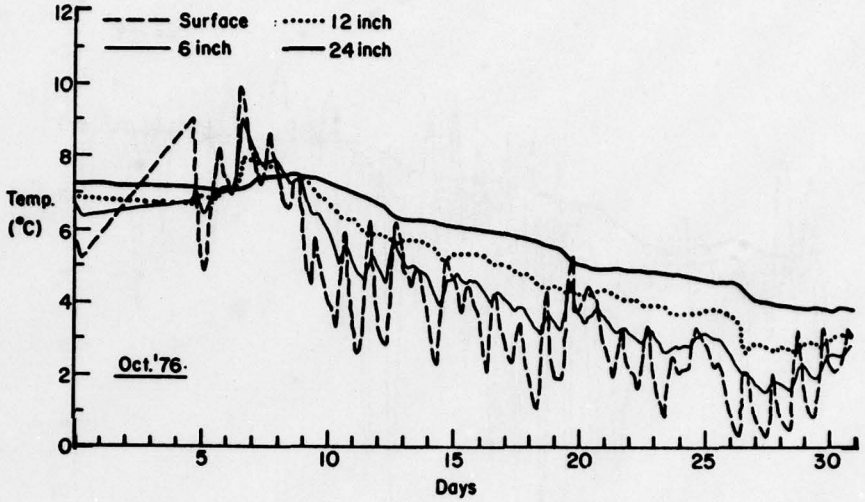


Fig. B1



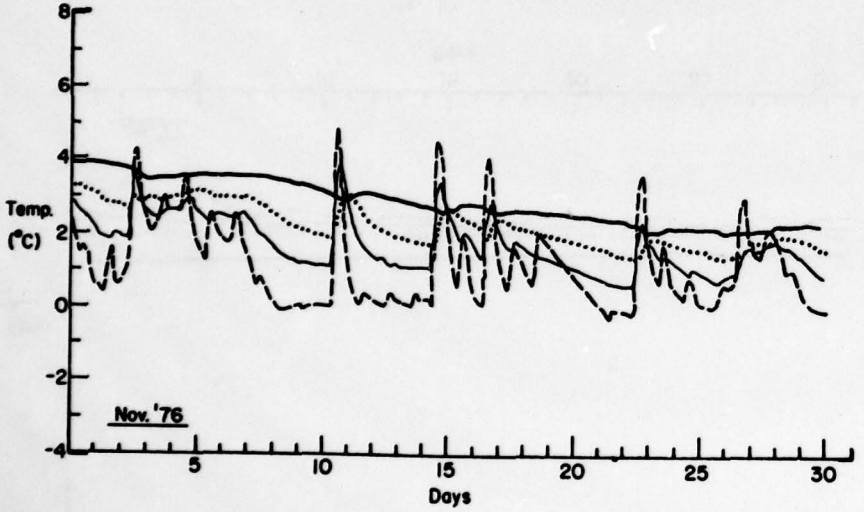


Fig. B3

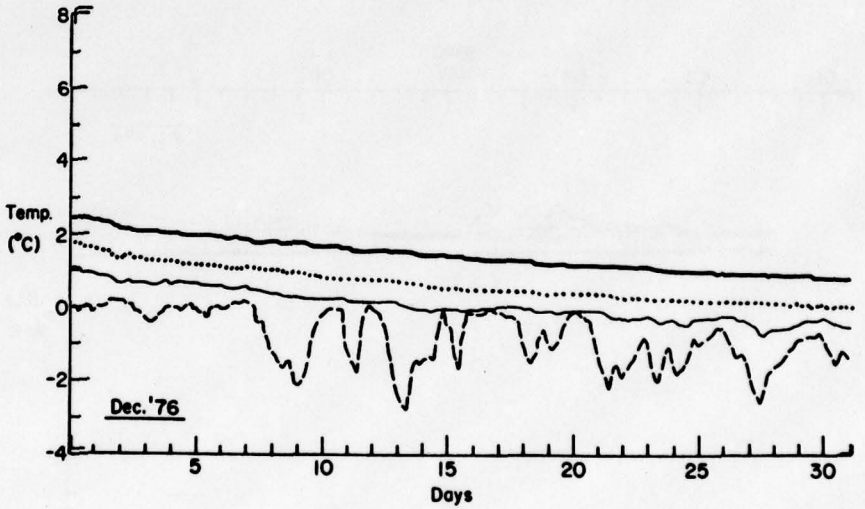


Fig. B4

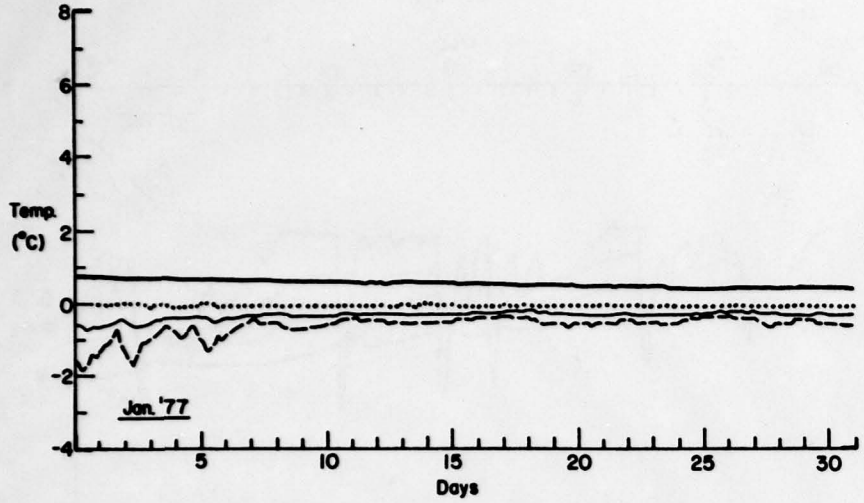


Fig. B5

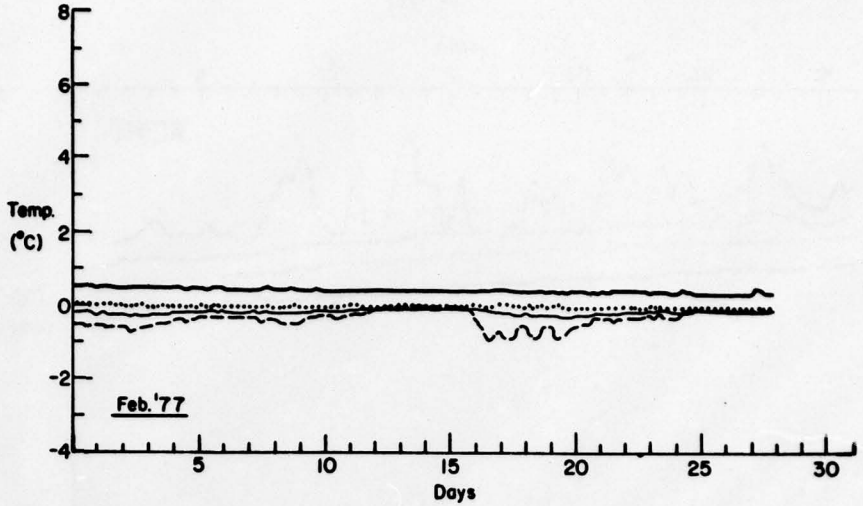


Fig. B6

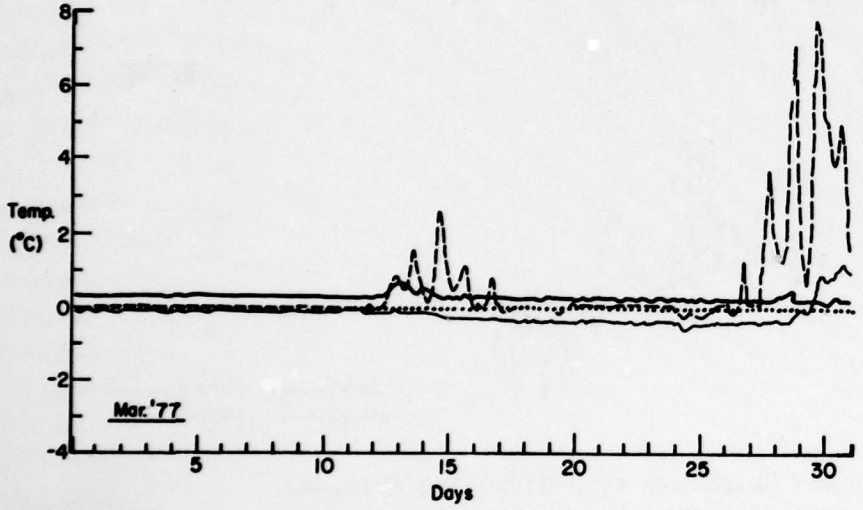


Fig. B7

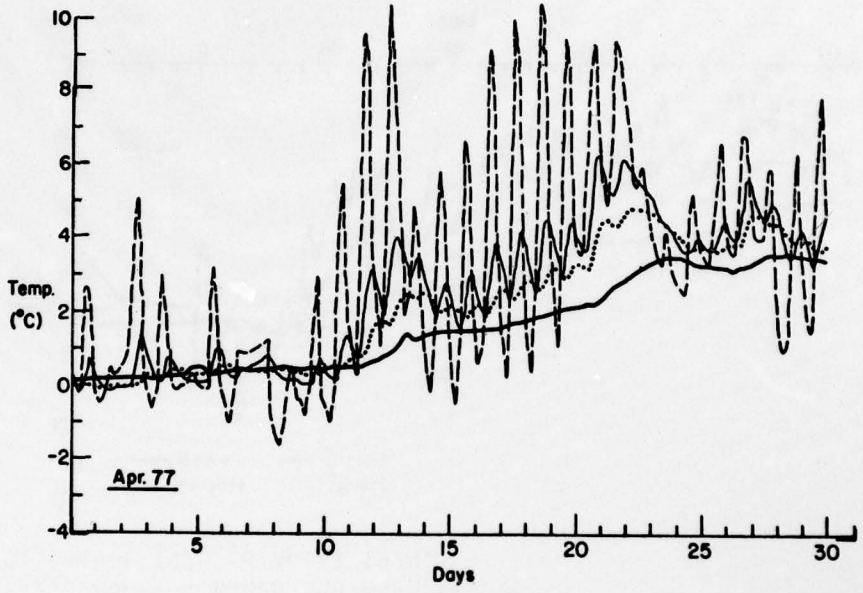


Fig. B8

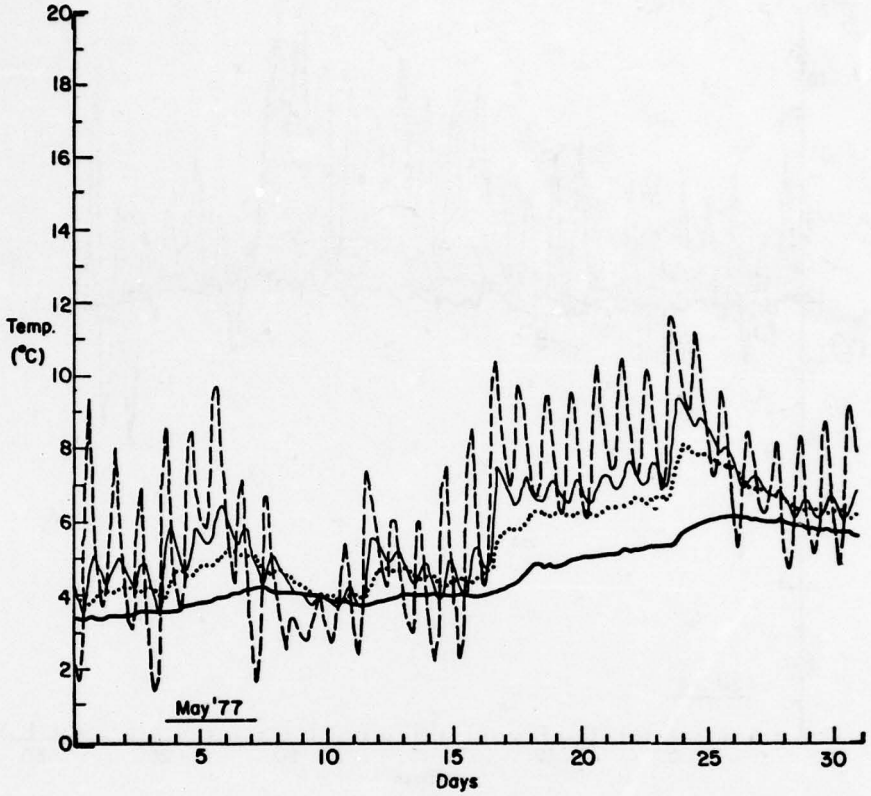


Fig. B9

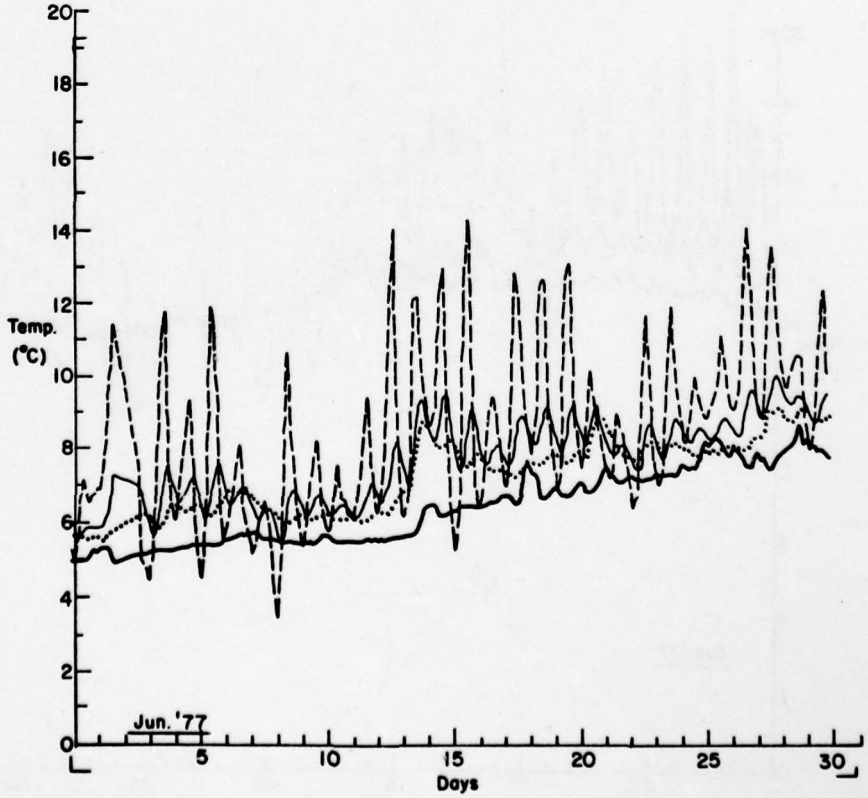


Fig. B10

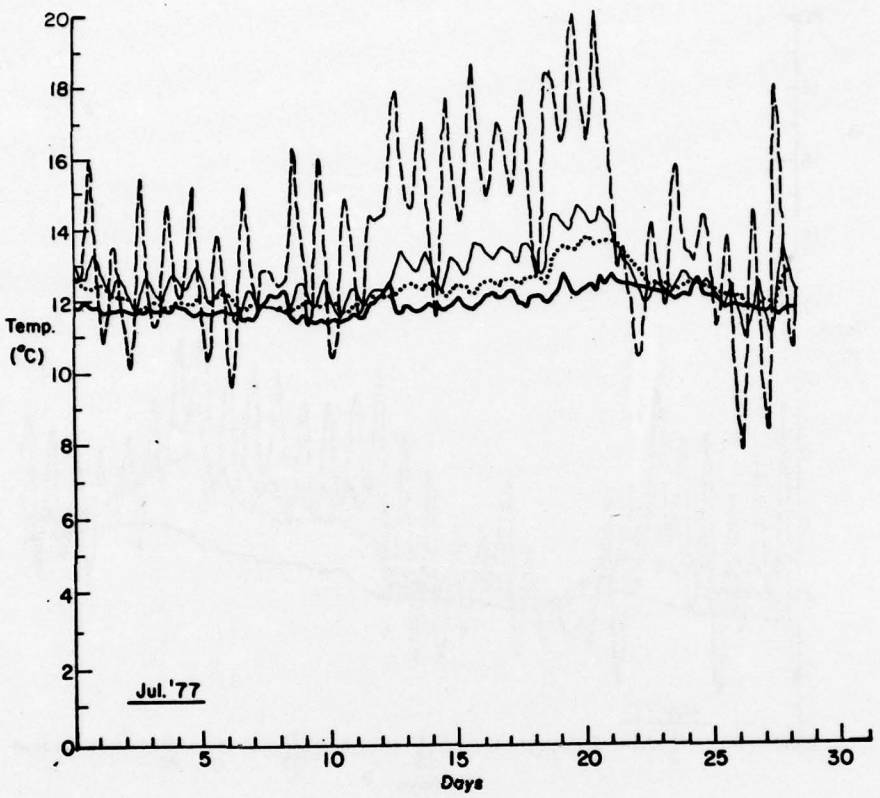


Fig. B11

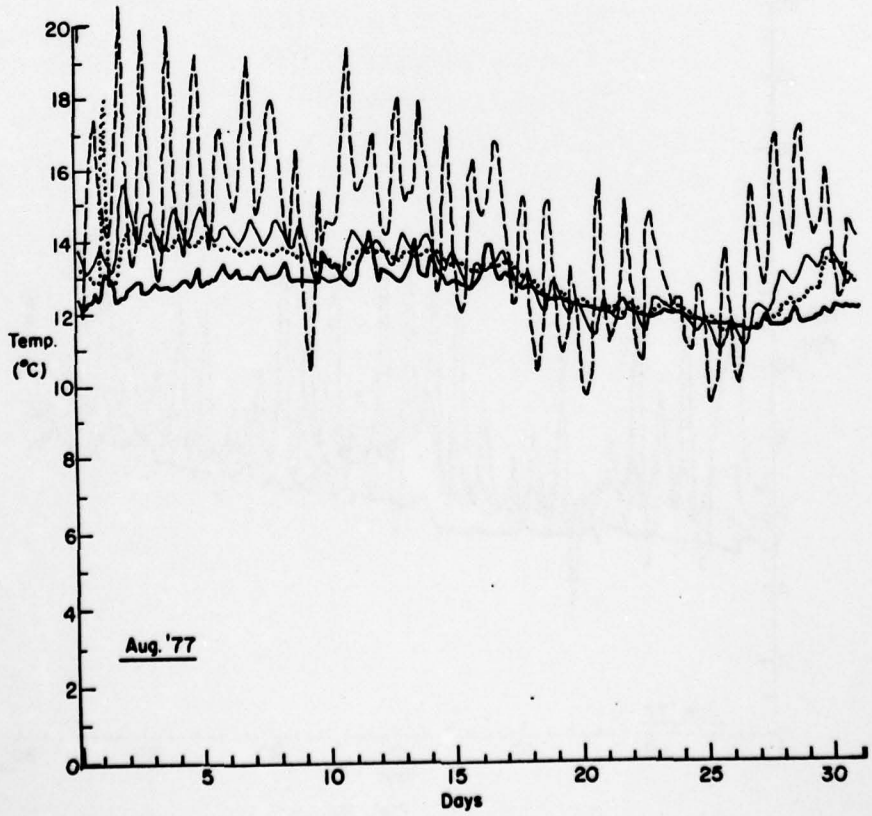


Fig. B12

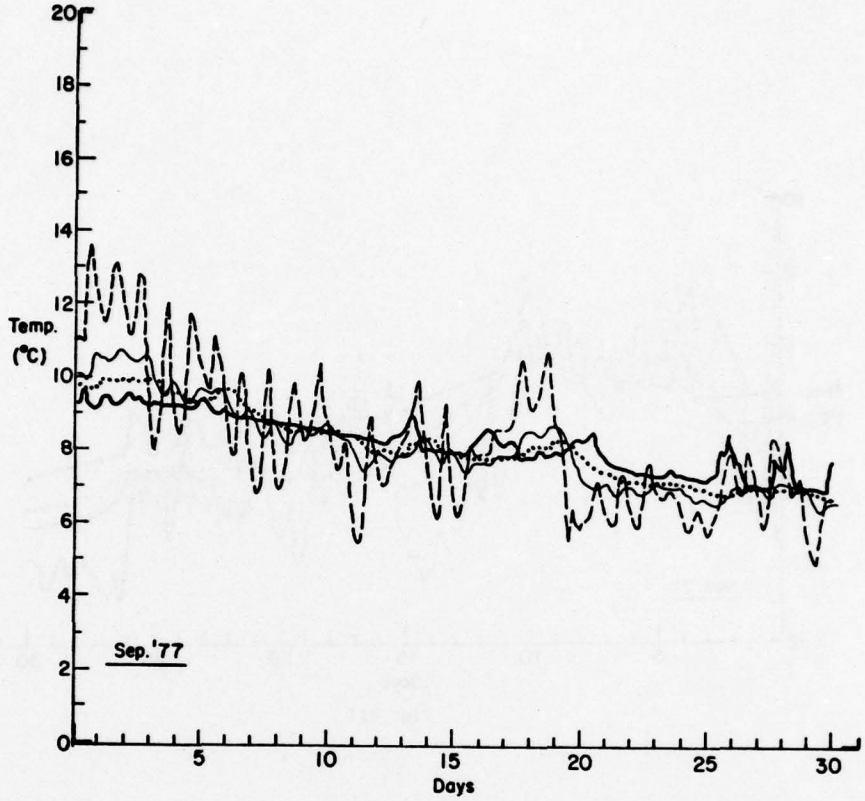


Fig. B13

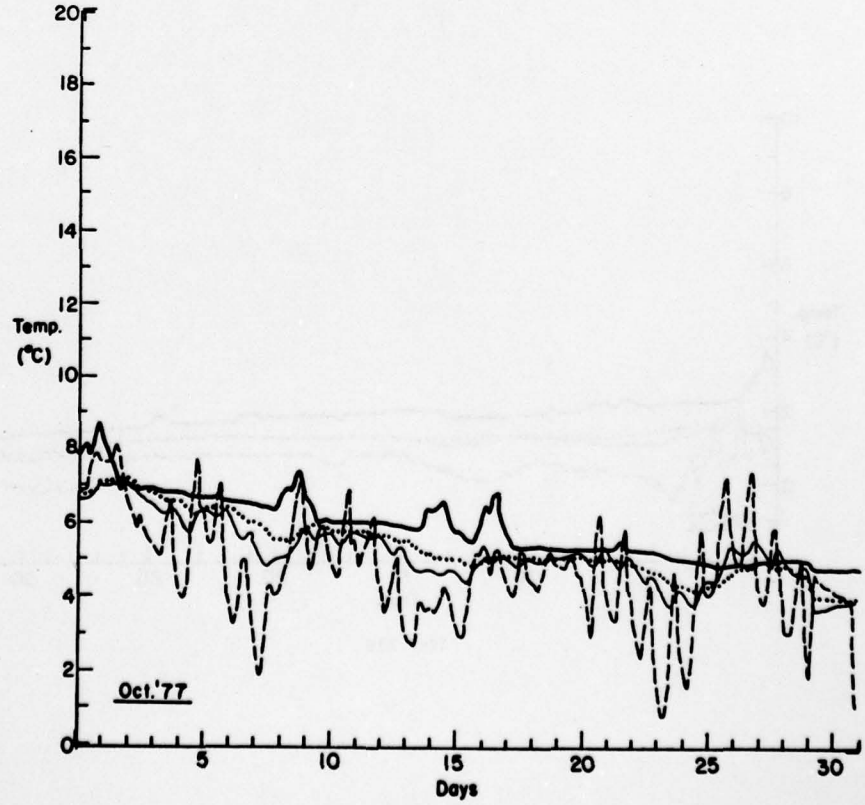


Fig. B14

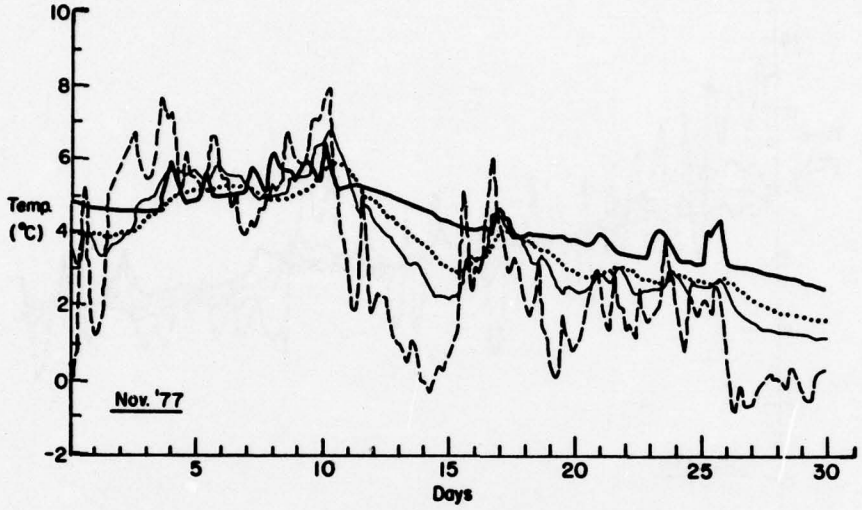


Fig. B15

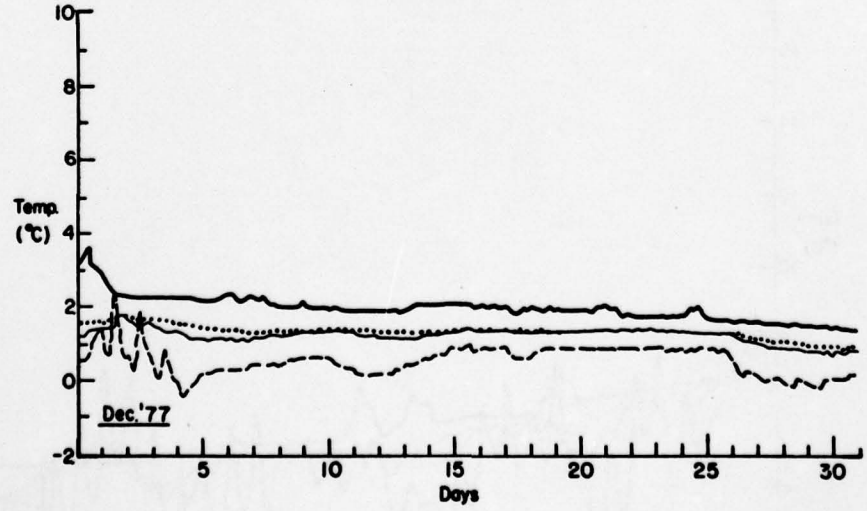


Fig. B16

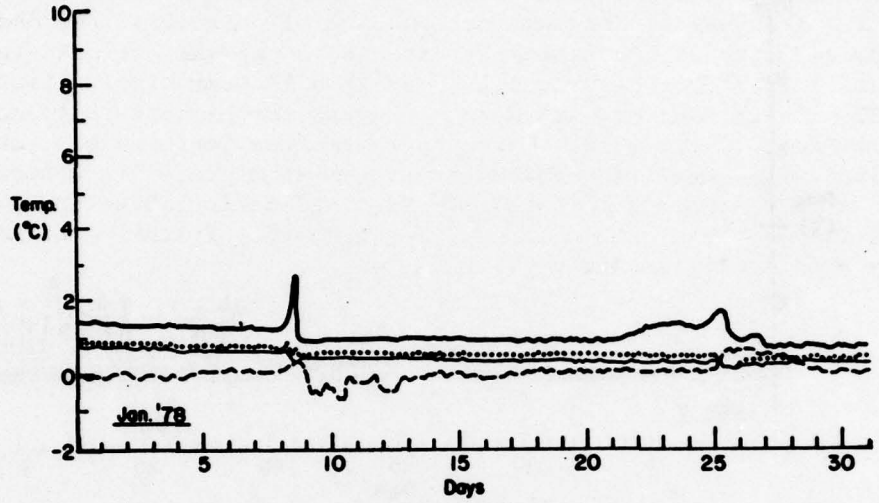


Fig. B17

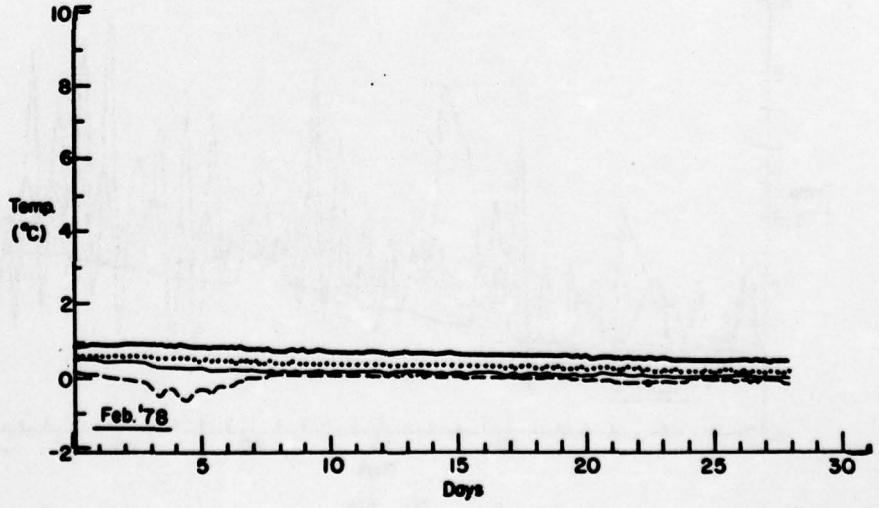


Fig. B18

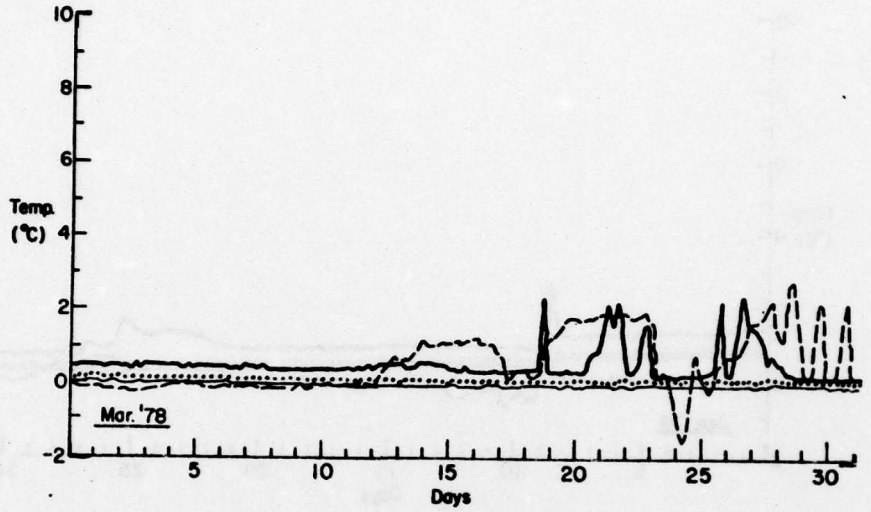


Fig. B19

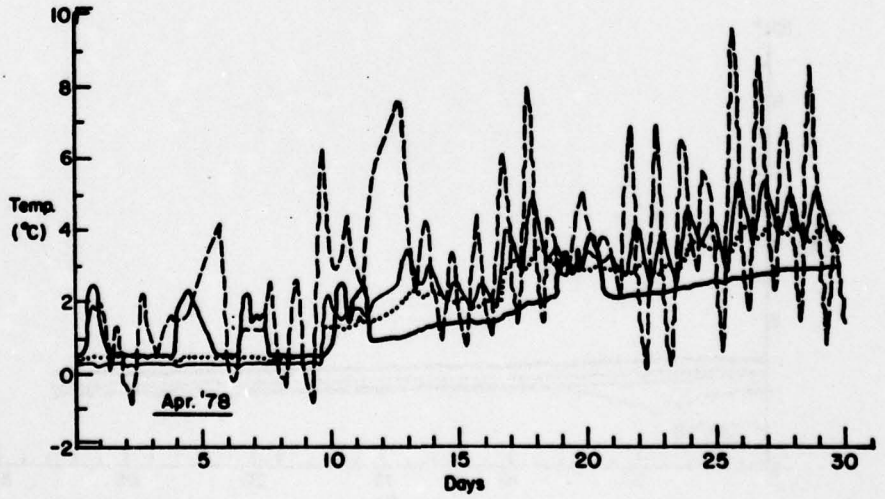


Fig. B20