

RESEARCH SUB-PROGRAM

MAINTENANCE PROGRAM FOR THREE SOUTHWESTERN ONTARIO WATERSHEDS, 1995 - 96

June 1996

COESA Report No.: LMAP - 016c/96

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FORWARD

This report summarizes the continuation of agronomic and water quality/quantity monitoring activities from three Southwestern Ontario watersheds which were initiated in the mid-eighties under previous environmental programs, such as SWEEP (Soil and Water Environmental Enhancement Program). These activities have been continued in support of research projects sited on these watersheds under the **COESA** (Canada-Ontario Environmental Sustainability Accord) Research Sub-Program of the Canada-Ontario Green Plan. The **GREEN PLAN** agreement, signed Sept. 21, 1992, is an equally-shared Canada-Ontario program totalling \$64.2 M, to be delivered over a five-year period starting April 1, 1992 and ending March 31, 1997. It is designed to encourage and assist farmers with the implementation of appropriate farm management practices within the framework of environmentally sustainable agriculture. The Federal component will be delivered by Agriculture and Agri-Food Canada and the Ontario component will be delivered by the Ontario Ministry of Agriculture and Food and Rural Assistance.

From the 30 recommendations crafted at the Kempenfelt Stakeholders conference (Barrie, October 1991), the Agreement Management Committee (AMC) identified nine program areas for Green Plan activities of which the three comprising research activities are (with Team Leaders):

1. **Manure/Nutrient Management and Utilization of Biodegradable Organic Wastes** through land application, with emphasis on water quality implications
 - A. Animal Manure Management (nutrients and bacteria)
 - B. Biodegradable organic urban waste application on agricultural lands (closed loop recycling)
(Dr. Bruce T. Bowman, Pest Management Research Centre, London, ONT)
2. **On-Farm Research:** Tillage and crop management in a sustainable agriculture system. (Dr. Al Hamill, Harrow Research Station, Harrow, ONT)
3. **Development of an integrated monitoring capability** to track and diagnose aspects of resource quality and sustainability. (Dr. Bruce MacDonald, Centre for Land and Biological Resource Research, Guelph, ONT)

The original level of funding for the research component was \$9,700,000 through Mar. 31, 1997. Projects will be carried out by Agriculture and Agri-Food Canada, universities, colleges or private sector agencies including farm groups.

This Research Sub-Program is being managed by the Pest Management Research Centre, Agriculture and Agri-Food Canada, 1391 Sandford St., London, ONT. N5V 4T3.

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The following report, approved by the Research Management Team, is reproduced in its entirety as received from the contractor, designated on the previous page.

Maintenance Program for Three Southwestern Ontario Watersheds 1995 - 1996

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Prepared on: October 31, 1996

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Maintenance Program for Three Southwestern Ontario Watersheds

June 1, 1995 - May 31, 1996

1.0 Introduction

The Upper Thames River, Essex Region and Kettle Creek Conservation Authorities monitor agricultural practices, climatic conditions, water quality and water quantity as a Research Sub-Program of the Canada-Ontario Agriculture Green Plan. Data collected under this program represent a continuation of the effort by Conservation Authorities to reduce non-point source pollution from agricultural land through voluntary programs. With the cooperation of the individual farmers, the Authorities have introduced conservation cropping and tillage practices, guided the installation of erosion control structures, and provided technical assistance to modify farm management practices.

The Kettle Creek and Belle/Puce River study areas were former Pilot Watersheds in the Soil and Water Environmental Enhancement Program (SWEEP). Each study area (including Kintore Creek) or "Paired Watershed" consists of two equal size subwatersheds which form the headwaters of a creek or small river system. In the paired watersheds, one subwatershed was used to demonstrate the benefits of conservation practices while the second was maintained as a control. Agricultural practices and other activities were monitored throughout the subwatersheds while water quality and quantity were monitored at the outlet of each subwatershed. The Essex Region Conservation Authority monitors municipal drains at the headwaters of the Belle and Puce Rivers while Kettle Creek and Upper Thames River Conservation Authorities monitor the headwaters of Kettle Creek and Kintore Creek respectively.

Each year, an annual report has been prepared to present the information collected during the previous 12 months and to make the data available to other research programs. This report includes a summary and discussion of the 1995 crop information, the primary tillage methods from the fall of 1995 and spring 1996, and the environmental monitoring data collected between June 1, 1995 and May 31, 1996.

1.1 Background

The SWEEP Program was introduced in 1986 to reduce

Ontario's non-point source loading of phosphorous to Lake Erie from agricultural sources. SWEEP was also designed to maintain or improve the productivity of the primary agricultural sector in Southwestern Ontario by reducing or correcting soil erosion and degradation. Following the selection of paired watersheds in 1987, farm plans were developed before the monitoring programs were implemented in 1988. Kintore Creek replaced one of the original paired watersheds in 1989 and remained as part of the study throughout the SWEEP Program. Through Green Plan, the activities in the paired watersheds initiated under SWEEP have been extended until March 1997.

1.2 Purpose

During the SWEEP Program, the pilot watersheds attracted other research initiatives centred around the development and evaluation of new technology related to soil productivity and phosphorous movement from agricultural land to surface drainage systems. The scope of research programs increased through Green Plan and defined a need for an inter-agency presence in the paired watersheds to help sustain a desirable level of conservation practices by the agricultural community. The monitoring programs established during SWEEP were continued to enhance the current level of knowledge and provide support for the other research programs.

The following list of research projects were conducted or continued within the paired watersheds during the scope of this report.

Upper Thames River Conservation Authority - Kintore Creek Paired Watersheds:

- 1) Impact of Manure Application Methods on Water Quality, Focusing on Nitrogen and Bacteria Transport in Soil. Dr. Greg Wall, AAFC, Guelph.
- 2) Partitioning of Solutes from Agricultural Fields within the Hydrologic System at Two Sites in Southern Ontario and the Subsequent Impact on Adjacent Aquatic Ecosystems. Dr. David Rudolph, University of Waterloo.

Essex Region Conservation Authority - Belle and Puce

River Paired Watersheds:

- 1) Effect of Controlled Drainage/Subirrigation on Tile Drainage Water Quality and Crop Yields at the Field Scale. Dr. Ian van Wesenbeeck, AAFC, Harrow.

Kettle Creek Conservation Authority - Kettle Creek Paired Watersheds:

- 1) Transport and Dissipation Pathways of Pesticides in Upland Watersheds Employing Conventional and Conservation Tillage In Ontario. Great Lakes Water Quality Program. Drs. Bowman and Wall, AAFC, London & Guelph.

1.3 Objectives

The objectives of the Maintenance Program for the three Southwestern Ontario Paired Watersheds remain unchanged during the 1995/1996 season.

- 1) To encourage continued adoption of conservation cropping and tillage practices within the three Paired Watersheds through dialogue with the landowners.
- 2) To monitor selected agronomic and environmental parameters in the three Watersheds using existing monitoring equipment from previous programs, in support of other research programs sited within the Watersheds.

1.4 Laboratory Analysis

To date, all of the water samples collected for this program have been analysed by the Ministry of the Environment and Energy's Laboratory in London. During the winter of 1996, the laboratory was closed for five weeks due to a strike by the Ontario Public Service Employees Union. All three Conservation Authorities lost valuable water quality data when samples were ruined during the laboratory closure. In addition, Provincial spending cuts resulted in permanent closure of the laboratory in May 1996. Samples collected by the Conservation Authorities during May remain in storage until laboratory support is restored; therefore, the results will not be included at this time.

2.0 Kintore Creek Paired Watersheds

2.1 Background

The Kintore Creek Watershed is formed by the headwaters of the Arthur-Vannatter and Logan Municipal Drains in the Township of Zorra of Oxford County. The two drains join southeast of Kintore to form Kintore Creek, which flows southward to join the Middle Branch of the Thames River at the Village of Thamesford, east of London.

The Arthur-Vannatter Drain in the western subwatershed drains 633 hectares (ha) of rolling cropland and the Logan Drain collects water from 628 ha in the eastern subwatershed. Well drained silt loam soils comprise the majority of both subwatersheds although pockets of poorly drained soil exist primarily in the eastern subwatershed. Both municipal drains originate in swampy headlands where groundwater discharge provides continuous base flow between 0.05 and 0.07 m³/s in midsummer. Through application of the Universal Soil Loss Equation and calculation of the delivery ratio between points, more than 40% of the study area had high potential for soil erosion and sediment delivery to the surface drainage system prior to the initiation of a remedial program in the 1980's.

In the Kintore Creek Paired Watersheds, thirty landowners manage dairy, beef, swine and cash crop operations. The primary crop in both east and west subwatersheds is historically corn. Soybeans and grains are also produced in both watersheds. In the western subwatershed, just over 500 hectares (ha) have been involved in active agriculture while 340 ha were cultivated in the eastern. The eastern watershed has significantly less area involved in active agriculture due to the greater percentage of woodlot coverage.

2.2 Climate

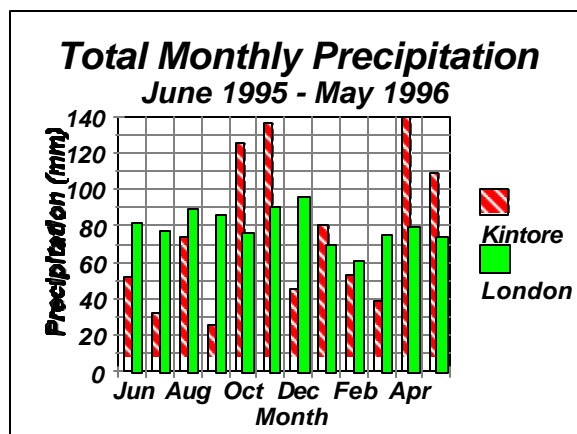
Rainfall and temperature data were collected at a meteorological station operated by Agriculture Canada in the western subwatershed. The station is equipped with a tipping bucket rain gauge and temperature sensor which provide information to a Campbell data logger. Since the station is not equipped to monitor snowfall, precipitation data for the months of December, January, February and March were obtained from the Atmospheric Environment Service (AES) weather station at London Airport.

The climatic information collected in the Kintore Creek Watershed during the months covered by this report is included in Appendix A. In general, the weather conditions during the 12 month period are described as a warm, dry summer, a cool, wet autumn, a typical winter, and a cold, wet spring. October 1995 was marked by a significant rainfall event resulting from the remnants of a hurricane. Brief winter thaw periods occurred in mid January and late February. Continuous daily mean temperature measurements above freezing did not begin until April 10, 1996.

2.2.1 Precipitation

From June through to September 1995, total monthly precipitation was below the 30 year normal (1961 - 1990, at London Airport AES) by as much as 70%. Soil moisture was significantly reduced during this period as the growing season passed without a significant runoff event. Early in October 1995, the first significant runoff event of the fall season resulted from more than 40 millimetres of rain in a 24 hour period. The largest runoff event occurred in early November 1995 when approximately 60 mm of rain fell over a two day period. Both October and November had more than 150% of their normal precipitation.

Figure 1. Total monthly precipitation in the Kintore Paired Watersheds.



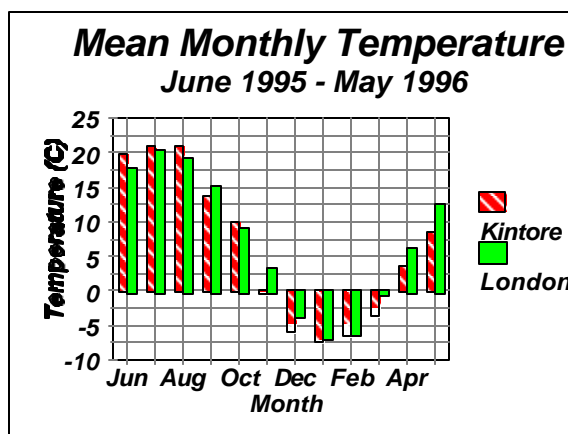
In December 1995, total precipitation was only 50% of the normal. A brief thaw in mid-January eliminated the accumulated snow cover and produced a runoff event. Snow cover was removed in late February by a brief thaw accompanied by rain. Total precipitation for March was only 50% of normal but a brief thaw in late March produced significant runoff. Both April and

May were very wet with total precipitation exceeding 150% of normal in each month.

2.2.2 Temperature

The mean monthly temperature recorded through June, July and August was between one and two degrees above the 30 year normal (1961 - 1990) at London Airport AES. September was slightly cooler than the AES normal, October slightly warmer, and both November and December were three degrees colder than the normal mean monthly temperature. January and February had normal mean temperatures, but March, April and May were all three to four degrees colder than normal.

Figure 2. Mean monthly temperature in the Kintore Paired Watersheds.



2.3 Agricultural Practices

The Upper Thames River Conservation Authority promoted conservation cropping and tillage practices to the farmers in the western subwatershed during the SWEEP Program. These practices eventually spread to the eastern subwatershed which was originally designated as a control area. The primary concern in the demonstration subwatershed was and still is the percentage of active agricultural area protected from soil erosion by crop residue or cover crops such as alfalfa, pasture, winter wheat, or fall rye. Cover Crop and greater than 30% crop residue can significantly reduce soil erosion. An additional concern is the timing and type of tillage used to prepare each field in preparation for planting the spring crop. Spring tillage maintains crop residue or cover crop during the winter months, and minimum tillage systems further reduce soil erosion potential.

2.3.1 Crop Production

Cropping information for Kintore Creek was collected through direct contact with landowners, written submissions or observations recorded during field work. The crops produced during the 1995 season for both the eastern and western subwatersheds are summarized in Table 1. A detailed map of the individual farms and their field boundaries, and a breakdown of the cropping and tillage data are included in Appendix B. In the western subwatershed, corn accounted for 275 ha while soybeans, grains and alfalfa/pasture covered 122, 48.2 and 60 ha respectively. In comparison, the eastern subwatershed produced 144 ha of corn, 70 ha of soybeans, 22.7 ha of grains, and 103.2 ha of alfalfa/pasture.

Table 1. Crop production in the Kintore Paired Watersheds for 1995.

| Crop Type | Western Subwatershed | | Eastern Subwatershed | |
|-------------------|----------------------|------------|----------------------|------------|
| | Area (ha) | % of Total | Area (ha) | % of Total |
| Corn | 275 | 54 | 144 | 42 |
| Soybeans | 122 | 24 | 70 | 21 |
| Alfalfa & Pasture | 60 | 12 | 103.2 | 30 |
| Grain | 48.2 | 10 | 22.7 | 7 |
| Total | 505.2 | 100 | 339.9 | 100 |

% of Total = area in active agriculture

With approximately 50% of the crop area, corn continues to be the dominant crop type in both subwatersheds. Over the past five years, the total area planted in corn decreased in the western subwatershed and remained constant in the eastern subwatershed after a low in 1991. Soybean production has continued to increase in both subwatersheds through the same period. Alfalfa and pasture were more prevalent in the east and account for 33% of the crop area. Grain production in both subwatersheds fluctuated from year to year. Sweet corn and coloured beans, such as kidney and white beans, were uncommon crops through this period.

In 1995 warm weather conditions through the summer months provided an abundance of heat for crop growth. Unfortunately, below average rainfall through July, August and September reduced the potential for record crop yields. Corn cob size was limited by the dry conditions and soybeans suffered from early leaf drop. At harvest time, yields for both corn and soybeans were average across the watersheds as a result of the lack of moisture (OMAFRA, 1996).

Soybeans were harvested before the heavy rainfall in

October and virtually all of the corn was harvested before the heavy rainfall in November. Moisture from precipitation in early October was quickly absorbed by dry soil and did not significantly delay field activities. Field conditions were poor after the November rainfall event, limiting the opportunity for further primary tillage in the fall. Crop residue remained on many fields over the winter even though time and conditions would have permitted fall tillage. In total, crop residue or cover crop was maintained on 55% of the western subwatershed and 74% of the eastern.

2.3.2 Primary Tillage

A summary of the primary tillage method used to prepare fields for spring planting is provided in Table 2. The mouldboard plow continues to be the most popular method of primary tillage in both subwatersheds. In the west, the mouldboard was applied to 34% of the crop area in the fall and 32% in the spring. Only 21% of the crop area was fall plowed in the eastern subwatershed and 27% in the spring. Total hectares plowed for 1995/96 in the western subwatershed was similar to the 1994/95 season but 10% less area was plowed through this period in the east. The decreased use of the mouldboard was offset by an increase in spring chisel plow application. No-till planting remained similar to 1994/95 in both subwatersheds at 8% in the west and 12% in the east.

Table 2: Primary Tillage Practices in the Kintore Paired Watersheds (Fall 1995 & Spring 1996).

| Field Activity | Western Subwatershed | | Eastern Subwatershed | |
|--------------------|----------------------|------------|----------------------|------------|
| | Area (ha) | % of Total | Area (ha) | % of Total |
| Fall Mouldboard | 171 | 34 | 70.5 | 21 |
| Spring Mouldboard | 161 | 32 | 90 | 27 |
| Fall Chisel Plow | 44.7 | 9 | 18.6 | 5 |
| Spring Chisel Plow | 19.8 | 4 | 39.3 | 12 |
| Fall Disk | 14.6 | 2 | 0 | 0 |
| No Till | 41.3 | 8 | 40.9 | 12 |
| Cover Crop | 53.5 | 11 | 79.7 | 23 |
| Total | 505.9 | 100 | 339 | 100 |

Cover Crop = alfalfa, pasture and winter wheat

Over the past five years, fall mouldboard use has varied from 5% to 44% in the western subwatershed and from 1% to 44% in the eastern. Spring mouldboard use fluctuates in response to fall application. In total, the mouldboard is generally used to till 70% of the western subwatershed and 60% of the eastern subwatershed in preparation for spring planting. Through the past five years, approximately 12% of the western subwatershed and 25% of the eastern subwatershed have been maintained as cover crop from November through March.

2.4 Water Quality

Water samples were collected from stations at the two subwatershed outlets and a total of five upstream stations across the Kintore Paired Watersheds. A routine sample run was completed on a weekly basis to characterize water quality during base flow conditions. Grab samples were collected with the aid of a USDH 48 depth integrated water sampler. Ice accumulation in the channel reduced the sampling frequency during January, February and March.

Water samples were collected during storm events when total discharge increased as a result of winter thaw, spring melt or precipitation. Event samples were primarily collected with the aid of ISCO automatic water samplers located at the subwatershed outlets. When staff were present during storm events, grab samples were collected from all stations within the paired watersheds.

All of the available data is presented in Appendix C by order of station number. Station 1 is the outlet of the western subwatershed and stations 2 and 3 are upstream locations. Station 5 is the outlet of the eastern subwatershed and 6, 7 and 8 are upstream. Samples obtained with the ISCO samplers from stations 1 and 5 are presented on separate pages. Routine samples were analysed for suspended solids, pH, conductivity @ 25°C, ammonia, total Kjeldahl nitrogen (TKN), nitrates, nitrites, total phosphorous, soluble reactive phosphorous, sodium, potassium and chlorides. Event samples from the ISCO samplers were analysed for suspended solids, total phosphorous and TKN.

The results of samples collected at the outlets during base flow conditions were summarized and the information is presented in Table 3. The data is presented as an inter-quartile range between the 25th and 75th quartiles. These values are typical for the water quality at the outlet of each subwatershed during base flow conditions. Efforts to promote conservation cropping and tillage practices are not expected to improve water quality during base flow conditions.

Although a detailed discussion of water quality is beyond the scope of this report, some similarities and differences in the data should be noted. The typical range for pH was 8.0 to 8.3 for both outlets. The pH decreased as chlorides and suspended solids increased. Nitrogen, phosphorous and potassium

parameters had slightly higher inter-quartile ranges in the western subwatershed, with nitrates depicting the greatest difference. Both sodium and chlorides also had higher concentrations in the western subwatershed.

Table 3. Water quality during base flow conditions at the Kintore Paired Watershed outlets.

| Parameter | Western Subwatershed | Eastern Subwatershed |
|-----------------------------|----------------------|----------------------|
| | 25th - 75th Quartile | 25th - 75th Quartile |
| Suspended Solids (mg/L) | 3.6 - 10.8 | 5.0 - 11.7 |
| Total Phosphorous (mg/L) | 0.03 - 0.06 | 0.03 - 0.05 |
| Soluble Phosphorous (mg/L) | 0.01 - 0.025 | 0.01 - 0.02 |
| Ammonia (mg/L) | 0.075 - 0.285 | 0.06 - 0.17 |
| Total Kjeldahl (mg/L) | 0.495 - 0.86 | 0.39 - 0.72 |
| Nitrates (mg/L) | 5.25 - 9.4 | 1.8 - 3.35 |
| Nitrites (mg/L) | 0.02 - 0.05 | 0.01 - 0.02 |
| pH | 8.1 - 10.8 | 8.02 - 8.29 |
| Conductivity (Fs/cm @ 25°C) | 612 - 663 | 536 - 573 |
| Chlorides (mg/L) | 16.2 - 30.45 | 9.0 - 13.7 |
| Sodium (mg/L) | 5.45 - 7.5 | 3.58 - 4.15 |
| Potassium (mg/L) | 1.51 - 2.51 | 1.38 - 2.15 |

For water samples collected during storm events, suspended solids, total phosphorous and total Kjeldahl nitrogen concentrations peaked before peak discharge occurred. Storm event samples for March and April 1996 had significantly higher peak concentrations of suspended solids, total phosphorous and TKN compared to samples collected during the November rainfall event. Peak concentrations for suspended solids were much higher in the eastern subwatershed than the western subwatershed for events sampled during November, March and April.

2.5 Water Quantity

At the two subwatershed outlets, stilling wells were installed and equipped with Stevens strip chart recorders prior to the SWEEP Program. The recorders provide a continuous record of the stage in each channel throughout most of the year. Unfortunately, the stilling wells freeze in late December and remain frozen until late March or early April. Stage data for these months was recorded by Telog data loggers that sensed water depth in the main channel.

During routine sample runs, a velocity and depth

profile of the channel was completed at each of the seven stations. A Montedoro-Whitney portable velocity meter and wading rod were used to make field measurements. Discharge was calculated by the velocity-area method and stage-discharge relationships were developed for all stations. The curves for the two outlets will be used in conjunction with the stage information from the data loggers and strip charts to produce discharge tables. This information will be provided under separate cover pending availability.

3.0 Kettle Creek Paired Watersheds

3.1 Background

The Kettle Creek Paired Watersheds are located within the southern boundary of the City of London (formerly the Town of Westminster), in Middlesex County. Both the eastern and western subwatersheds drain in a southerly direction by open municipal drain to Kettle Creek which flows south through Elgin County into Lake Erie.

The Madter Drain in the western subwatershed drains 380 ha (940 acres), and the Holtby Drain in the eastern subwatershed drains 355 ha (880 acres). Soils are a combination of moderately drained Brant silt loam and poorly drained Muriel silty clay loam. Surface slopes of 2 to 5% drain open fields and grassed waterways to the open municipal drains. Tile drainage systems exist in depression areas and broad swales across the watersheds.

In the Kettle Creek Paired Watersheds, seventeen farmers manage cash crop, dairy, swine, poultry and vegetable operations. Farm systems in the watersheds typically consist of row crops, predominately corn, soybeans and winter wheat, but several cash crop with livestock systems exist. Homesteads and woodlot cover 25 ha in the western subwatershed while 19 acres in the eastern subwatershed is considered to be non cropped land use.

3.2 Climate

Climatic information was collected through the use of a computer based data logger located at the Madter drain outlet. Daily maximum and minimum air temperature, soil temperature, rainfall, daily average water temperature, and relative humidity were all monitored at this station.

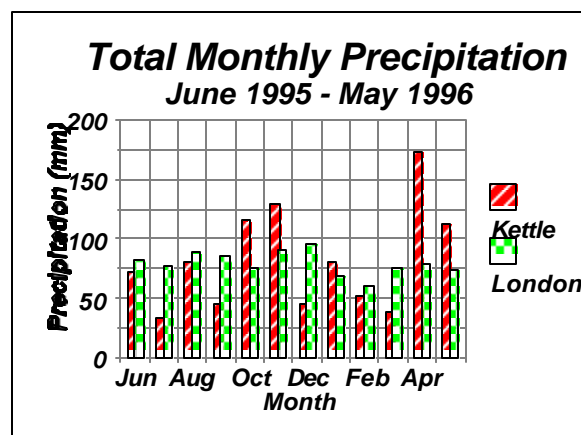
Generally, the summer of 1995 was considered dry

from mid June until mid September. Below normal rainfall and slightly above normal air temperature characterized the summer. Dry conditions continued until early October when the remnants of hurricane Opal delivered 50-100 mm of rain to the area. Soil moisture conditions were reasonable at harvest time, yet successive rains and high humidity delayed harvest. The winter months were slightly colder than average while snowfall was average. A summary of the climatic information collected in the Kettle Creek Watershed is included in Appendix D.

3.2.1 Precipitation

In Figure 3, total monthly precipitation in the Kettle Creek Paired Watershed is compared with the 30-year normal (1961 - 1990) at the Atmospheric Environment Service (AES) weather station at London Airport. Although June and August 1995 received 90% of the normal monthly precipitation, overall the growing season was dry. Both July and September received only 50% of their normal monthly precipitation. October and November were very wet with approximately 150% of the normal precipitation. January 1996 was the only winter month that had above normal precipitation. April was extremely wet with more than 200% of normal, and May had 150% of normal.

Figure 3. Total monthly precipitation in the Kettle Creek Paired Watersheds.

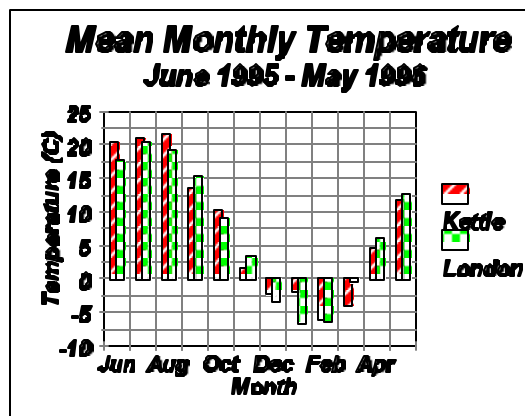


3.2.2 Temperature

The mean monthly air temperature was between one and two degrees Celsius above the AES normal through June, July and August. September and November were slightly colder than normal while October was slightly warmer. January was five degrees

warmer than normal but both December and February were near normal. The spring months were all one to three degrees colder than normal.

Figure 4. Mean monthly temperature in the Kettle Creek Paired Watersheds.



3.3 Agricultural Practices

The 17 farmers in the watersheds were surveyed to determine cropping and tillage practices between June 1995 and May 1996. Each farmer was approached to determine tillage strategies, crop type, fertilizer use, pesticide use and crop yield. Cropping and tillage information for both the eastern and western subwatersheds is included in Appendix E. A detailed map of the individual farms and their field boundaries is also provided in Appendix E.

3.3.1 Crop Production

In the Kettle Creek Paired Watersheds, soybeans were the main crop produced during the 1995 season across both subwatersheds. In the western subwatershed, approximately 44% of the area was planted in soybeans and 30% in corn. Winter wheat and pasture/alfalfa covered approximately 13% each. A summary of the crops produced is included in Table 4.

Table 4. Crop production in the Kettle Creek Paired Watersheds for 1995.

| Crop Type | Western Subwatershed | | Eastern Subwatershed | |
|-------------------|----------------------|------------|----------------------|------------|
| | Area (ha) | % of Total | Area (ha) | % of Total |
| Corn | 88.2 | 30 | 130 | 40 |
| Soybeans | 131.3 | 44 | 133 | 40 |
| Alfalfa & Pasture | 40 | 13 | 36 | 11 |
| Wheat | 39.7 | 13 | 29.5 | 9 |
| Total | 299.2 | 100 | 328.5 | 100 |

% of Total = area in active agriculture

Corn was more common in the eastern subwatershed where 40% of the area was used for corn production. Winter wheat and alfalfa/pasture covered about 10% each. Moisture stress from the summer did not appear to have a significant impact on crop yield as most farmers reported average to above average yields.

3.3.2 Primary Tillage

In the western subwatershed, no-till agricultural systems accounted for 61% of the land area. Primary tillage was only used on 25% of the active agricultural land prior to planting. Cover crop or crop residue was maintained on more than 75% of the western subwatershed through the winter months. A summary of the primary tillage methods for the fall of 1995 and the spring of 1996 is provided in Table 5.

Table 5. Primary tillage practices in the Kettle Creek Paired Watersheds.

| Field Activity | Western Subwatershed | | Eastern Subwatershed | |
|------------------|----------------------|------------|----------------------|------------|
| | Area (ha) | % of Total | Area (ha) | % of Total |
| Fall Mouldboard | 59.5 | 17 | 114.6 | 37 |
| Fall Disk | 0 | 0 | 19 | 6 |
| Fall Chisel Plow | 18.6 | 5 | 0 | 0 |
| Cover Crop | 49.6 | 14 | 41 | 13 |
| Soil Saver | 9.4 | 3 | 0 | 0 |
| No-till | 217.5 | 61 | 137 | 44 |
| Total | 354.6 | 100 | 311.6 | 100 |

Cover Crop includes wheat, pasture and alfalfa.

In the eastern subwatershed, approximately 37% of the active agricultural area was plowed in the fall. No-till planting was used on 44% of the active agricultural area. Cover crop or crop residue was maintained on 57% of the area through the winter months.

Over the past several years, the western subwatershed has consistently had about 10% more of the active agricultural area involved in no-till systems. However, it is important to note that the total area planted with no-till equipment has varied considerably.

3.4 Water Quality

Routine samples were collected from both subwatershed outlets on a bi-weekly basis when discharge occurred from the channels. Both drains were dry through the summer months and into the early fall of 1995. Storm event samples were collected in November, March and April. All of the available water quality data is included in Appendix F. Storm event samples collected with the aid of ISCO automatic

water samplers appear on separate pages.

The results of samples collected during base flow conditions were summarized and the results are provided in Table 6. With the limited quantity of data available, only the minimum and maximum values were included in the summary.

Table 6. Water quality during base flow conditions at the Kettle Creek Paired Watershed outlets.

| Parameter | Western Subwatershed | Eastern Subwatershed |
|-----------------------------|----------------------|----------------------|
| | Minimum - Maximum | Minimum - Maximum |
| Suspended Solids (mg/L) | 2.8 - 18.3 | 3.1 - 19.5 |
| Total Phosphorous (mg/L) | 0.03 - 0.25 | 0.03 - 0.5 |
| Soluble Phosphorous (mg/L) | 0.01 - 0.14 | 0.01 - 0.37 |
| Ammonia (mg/L) | 0.05 - 1.62 | 0.05 - 2.45 |
| Total Kjeldahl (mg/L) | 0.57 - 2.32 | 0.65 - 3.11 |
| Nitrates (mg/L) | 0.1 - 14.4 | 0.1 - 11.4 |
| Nitrites (mg/L) | 0.01 - 0.14 | 0.01 - 0.06 |
| pH | 7.91 - 8.53 | 7.63 - 8.42 |
| Conductivity (Fs/cm @ 25°C) | 463 - 865 | 420 - 846 |
| Chlorides (mg/L) | 29.6 - 82.1 | 24.2 - 87.5 |
| Sodium (mg/L) | 7.3 - 28.8 | 6.8 - 16.2 |
| Potassium (mg/L) | 2.45 - 5.24 | 2.74 - 11.6 |

Water quality in both drains was very similar during the monitoring period. The eastern subwatershed has slightly higher maximum concentrations of total phosphorous, soluble reactive phosphorous and ammonia.

3.5 Water Quantity

At each of the subwatershed outlets, discharge was measured with the aid of a portable velocity meter and wading rod. Total discharge was calculated using the velocity-area method, and a rating curve was developed for each outlet. Stevens strip chart recorders maintain a record of the water level in the channel at both subwatershed outlets. Data from the strip charts requires digitizing, and was not completed prior to this writing. Discharge tables will be prepared for both outlets and submitted at a later date.

4.0 Essex Region Paired Watersheds

4.1 Background

The Essex Region Paired Watershed Study is located in Maidstone Township of Essex County. The subwatersheds form the headwaters of the Belle and Puce Rivers. Both rivers drain north into Lake St. Clair, which is connected to Lake Erie through the Detroit River.

The western subwatershed drains 381 ha (942 ac) into the Puce River and the eastern subwatershed drains 282 ha (699.5 ac) into the Belle River. Both watersheds are dominated by agricultural practices with intensive cash cropping accounting for the majority of activity in each watershed. Poorly drained, extensively sub-surface tiled Brookston clay soils predominate the area. The landscape in the region is gently undulating, with less than 1% slope. Erosion rates are not as high in the Essex Watershed when compared to Kintore or Kettle Creek; however, due to limited retention areas, such as buffer strips and vegetative cover, and the extensive drainage network, the delivery ratio to area streams is very high.

During the SWEEP Program, the western subwatershed was designated as the demonstration area and the eastern maintained as a control. A predominately corn-soybean-winter wheat crop rotation system is being practiced in both subwatersheds. A total of 37 parcels of land are owned and/or operated by 26 different farmers.

4.2 Climate

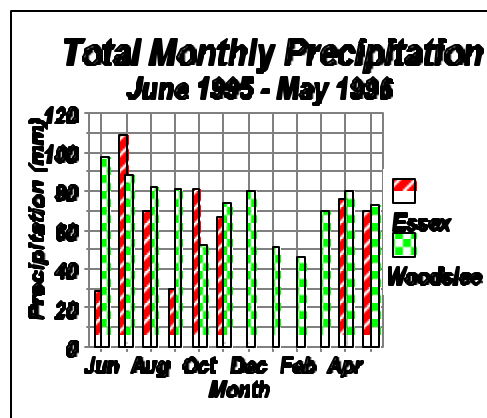
The environmental monitoring station at the western subwatershed outlet is equipped with sensors which measure air temperature, rainfall, soil temperature, water temperature and the water level in the channel. Information is stored onsite in a Campbell data logger and retrieved through a modem. Snowfall is not monitored at this location; therefore, monthly precipitation totals were not available for December, January, February or March.

The climatic information collected in the Essex Region Paired Watershed is included in Appendix G. The weather conditions over the 12 month period are described as a warm, dry summer, a cool, wet autumn, and a cool wet spring. The remnants of hurricane Opal passed through the area on October 6 yet total rainfall from June through October was only 80% of the long-term normal measured at the Woodslee Research Station.

4.2.1 Precipitation

June and September 1995 were particularly dry with only 30% to 40% respectively of the normal monthly precipitation measured at Woodslee. July had more precipitation than normal but above average temperatures promoted evaporation. October was unusually wet which is mainly attributed to the remnants of the hurricane. April and May were near normal but the rain was successive and the general lack of sunshine and warm temperatures prevented the soil from drying. December, January, February and March data was not available and therefore excluded from this discussion. A comparison of total monthly precipitation in the paired watersheds with the 30 year normal at Woodslee research station is provided in Figure 5.

Figure 5. Total monthly precipitation in the Essex Region Paired Watersheds.

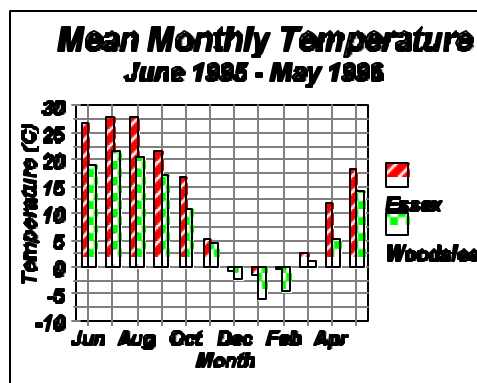


4.2.2 Temperature

The mean monthly air temperature recorded through the summer of 1995 was one degree colder than the long term average for June, and one degree and three degrees warmer for July and August respectively. September was slightly cooler than normal, October slightly warmer and November was 3 degrees colder than the long term mean temperature.

December was near normal, but January and February were both a little warmer than usual. Cold weather continued through March, and only warmed slightly through April and May. In Figure 6, air temperature monitored in the paired watershed is compared with the long-term mean temperature measured at the Woodslee research station.

Figure 6. Mean monthly temperature in the Essex Region Paired Watersheds.



4.3 Agricultural Practices

Cropping and tillage information for the Essex Region Paired Watersheds was obtained through direct contact with the landowners. Agronomic survey forms were distributed to all landowners to obtain information about their farm management practices. Data collected included information on tillage practices, crops grown, fertilizers used, crop rotation patterns and general conservation practices. Field surveys were completed by Conservation Authority staff to confirm data.

4.3.1 Crop Production

A complete breakdown of the crops produced in the 1995 season, and the tillage methods used to prepare fields for planting in 1996, are included in Appendix H. Also, a map illustrating the individual farms and field boundaries through the 1995 crop season is provided.

In the western subwatershed, no-till farming accounted for a total of 35% of the land management practices compared to 15% in the eastern subwatershed. Soybean and winter wheat comprised the greatest percentage of crops produced under no-till management. This is comparable to Essex County averages where 50% to 60% of the soybeans and winter wheat planted in 1995 were done using no-till equipment while only 5 to 10% of the corn crop was planted using no-till. (OMAFRA, 1996)

Winter wheat acreage was higher in 1995 than in 1994 indicating that several farmers are at the same stage in

a corn-soybean-winter wheat crop rotation pattern. Due to problems with no-till planted corn following winter wheat, the majority of the farmers in the paired watersheds utilize some form of conventional tillage after wheat to ensure corn yields are not adversely affected. This tillage allows farmers to carry out land levelling practices to prepare the ground for no-till planting.

Table 7. Crop production in the Essex Region Paired Watersheds for 1995.

| Crop Type | Western Subwatershed | | Eastern Subwatershed | |
|-------------------|----------------------|------------|----------------------|------------|
| | Area (ha) | % of Total | Area (ha) | % of Total |
| Corn | 48 | 13 | 91 | 32 |
| Soybeans | 183 | 49 | 93 | 34 |
| Alfalfa & Pasture | 8.1 | 2 | 0 | 0 |
| Grain | 124.6 | 33 | 93 | 34 |
| Fallow | 9.7 | 3 | 0 | 0 |
| Total | 373.4 | 100 | 277 | 100 |

% of Total = area in active agriculture

A summary of the 1995 crop information is provided in Table 7. In the western subwatershed, soybeans were the dominant crop type during the 1995 season. Winter wheat covered 33% of the land area, and corn covered only 13%. In the eastern subwatershed, corn, soybeans and wheat shared the watershed equally.

Cool temperatures after planting in 1995 reduced the total heat units and corn growth was correspondingly slow. The warm, dry, summer provided the necessary heat, but overall crop yields for corn were below normal. Soybean and winter wheat yields were above average in 1995 (OMAFRA, 1996). Cool and wet conditions in the spring of 1996 delayed planting dates across the subwatersheds.

4.3.2 Primary Tillage

Tillage practices were largely influenced by past practices and the availability of equipment through Agriculture and Agri-Food Canada. The soil saver was made available on loan but also used by AAFC in the other areas. As scheduling problems arose, farmers resorted to conventional tillage methods in place of conservation equipment.

In the eastern subwatershed, the mouldboard plow was used on 77% of the active agricultural area. An additional 7% of the land area was disked in the fall. Crop residue or cover crop remained on only 12% of the cropped area through the winter months. More than 50% of the western subwatershed maintained

cover crop or crop residue over the winter. No-till systems were used on 43% of the active area and an additional 13% was tilled in the spring. A variety of methods were used to till land in the fall of 1995 (Table 8).

Table 8. Primary Tillage Practices in the Essex Region Paired Watersheds.

| Field Activity | Western Subwatershed | | Eastern Subwatershed | |
|------------------|----------------------|------------|----------------------|------------|
| | Area (ha) | % of Total | Area (ha) | % of Total |
| Fall Mouldboard | 46 | 12 | 217 | 77 |
| Fall Disk | 34 | 9 | 19 | 7 |
| Fall Chisel Plow | 53 | 14 | 0 | 0 |
| Fall S-Tine | 6 | 2 | 0 | 0 |
| Fall Cultivate | 29 | 7 | 0 | 0 |
| Spring Disk | 40 | 10 | 0 | 0 |
| Spring Cultivate | 11 | 3 | 0 | 0 |
| Fallow | 0 | 0 | 6 | 2 |
| No-till | 163 | 43 | 29 | 10 |
| Total | 382 | 100 | 283 | 100 |

Cover Crop = alfalfa, pasture and winter wheat

4.4 Water Quality

Water samples were collected from monitoring stations at the two subwatershed outlets in the Essex Region Paired Watersheds. A routine sample run was completed on a bi-weekly basis when discharge existed. In 1995, no discharge from either subwatershed occurred between June 1st. and October 6th.

Table 9. Water quality during base flow conditions at the Essex Region Paired Watershed outlets.

| Parameter | Western Subwatershed | Eastern Subwatershed |
|-----------------------------|----------------------|----------------------|
| | Minimum - Maximum | Minimum - Maximum |
| Suspended Solids (mg/L) | 2.9 - 7.1 | 4.3 - 6.6 |
| Total Phosphorous (mg/L) | 0.04 - 0.16 | 0.04 - 0.15 |
| Soluble Phosphorous (mg/L) | 0.01 - 0.07 | 0.01 - 0.08 |
| Ammonia (mg/L) | 0.08 - 0.28 | 0.05 - 0.18 |
| Total Kjeldahl (mg/L) | 0.65 - 1.07 | 0.6 - 1.29 |
| Nitrates (mg/L) | 0.3 - 8.2 | 0.3 - 2.9 |
| Nitrites (mg/L) | 0.02 - 0.04 | 0.01 - 0.08 |
| pH | 8.0 - 8.16 | 7.87 - 8.1 |
| Conductivity (Fs/cm @ 25°C) | 374 - 453 | 394 - 581 |
| Chlorides (mg/L) | 43.2 - 220 | 68.4 - 258 |
| Sodium (mg/L) | 15.9 - 87.7 | 19.9 - 86.2 |
| Potassium (mg/L) | 1.84 - 6.05 | 3.39 - 6.39 |

All of the available water quality data is included in

Appendix I. The minimum and maximum values for each of the parameters in base flow samples are presented in Table 9. Water quality during base flow conditions was very consistent between the two subwatershed outlets.

Storm event samples were collected during winter thaw, spring melt, and precipitation generated discharge increases. Event samples were collected with the aid of ISCO automatic water samplers at both subwatershed outlets.

4.5 Water Quantity

At the two subwatershed outlets, stream velocity was measured using Price 1210 AA and Gurley Mini flow meters. The velocity -area method was used to calculate total discharge and rating curves were developed for both outlets. A continuous record of the water level in each channel was maintained by a Leopold Stevens strip chart recorder.

5.0 Summary

From June 1, 1995 through May 31, 1996, Upper Thames River, Kettle Creek and Essex Region Conservation Authorities monitored agricultural practices, climatic conditions, water quality and water quantity in their respective paired watersheds. The information collected over the twelve month period has been summarized in the form of an annual report to present the information and make the data available to interested parties. A more comprehensive analysis of the data will be conducted upon completion of the current contract in March 1997.

Across the three paired watersheds, soil texture ranges from silt loam in Kintore, to silty clay loam in Kettle, and clay in Essex Region. All three watersheds have high potential for soil erosion and delivery to the surface drainage system. Cash crop farming systems dominate the watersheds but Kintore and Kettle also have mixed systems which include dairy and swine operations. Only Kintore has significant woodlot coverage in these intensive agricultural areas.

Corn was the dominant crop in the Kintore Creek Paired Watersheds, and soybeans were the most common in Kettle and Essex Watersheds for 1995. Corn and wheat were also major crops in the Kettle and Essex watersheds. No-till systems are more popular in the Kettle Creek Paired Watersheds where up to 60% has been planted with this method.

Cover crop area over the winter months was approximately 25% for all three watersheds. When cover crop was considered in conjunction with crop residue, Kintore and Kettle had 60 to 75% of the watershed area protected compared to 50% in the Essex.

Water quality during base flow conditions illustrated some significant differences between subwatershed outlets in the Kintore Creek Paired Watersheds. Both Kettle Creek and Essex Region Paired Watersheds had very similar water quality between outlets during base flow.

Appendices

Kintore Creek Paired Watersheds
Air Temperature and Precipitation Summary
 June 1, 1995 to May 31, 1996

A-1

| | | Precipitation | | Air Temperature | | | | | |
|------------|-----|---------------|-------|-----------------|-------|-------|-------|-------|-------|
| | | | | Kintore | | | AES | | |
| Year Month | | Kintore | AES | Min | Mean | Max | Min | Mean | Max |
| 1995 | Jun | 51.70 | 81.90 | 14.43 | 19.95 | 25.93 | 11.60 | 17.70 | 23.80 |
| 1995 | Jul | 31.60 | 76.70 | 15.76 | 21.00 | 26.10 | 14.20 | 20.30 | 26.40 |
| 1995 | Aug | 73.60 | 89.60 | 15.76 | 20.96 | 26.68 | 13.30 | 19.30 | 25.20 |
| 1995 | Sep | 25.30 | 86.20 | 7.23 | 13.81 | 20.42 | 9.60 | 15.30 | 20.90 |

**Kintore Creek -Paired Watersheds
Total Daily Precipitation (June 1, 1995 to May 31, 1996**

A-2

| Day | Jun | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May |
|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|--------|--------|
| 1 | 0.00 | 2.66 | 5.00 | 0.00 | 0.00 | 9.80 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 4.40 |
| 2 | 4.60 | 0.00 | 0.00 | 0.10 | 0.00 | 19.40 | 0.00 | 0.00 | 0.00 | 2.40 | 0.00 | 0.00 |
| 3 | 0.40 | 0.00 | 12.50 | 0.00 | 10.60 | 0.50 | 2.00 | 1.80 | 0.00 | 1.80 | 0.00 | 6.10 |
| 4 | 0.00 | 0.00 | 0.40 | 0.10 | 0.20 | 0.50 | 0.20 | 0.40 | 0.00 | 4.60 | 0.00 | 0.80 |
| 5 | 0.00 | 0.00 | 25.20 | 0.00 | 46.50 | 0.00 | 0.20 | 0.60 | 0.40 | 13.60 | 0.00 | 0.00 |
| 6 | 0.00 | 0.00 | 0.00 | 0.90 | 3.50 | 0.20 | 0.00 | 0.00 | 0.00 | 1.60 | 0.00 | 0.00 |
| 7 | 0.00 | 0.10 | 0.00 | 0.00 | 0.60 | 6.40 | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 | 0.30 |
| 8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 3.80 | 1.20 | 0.00 | 14.20 | 0.20 | 0.10 | 10.80 |
| 9 | 0.00 | 1.70 | 0.20 | 0.00 | 0.00 | 0.10 | 5.40 | 4.00 | 0.00 | 0.00 | 1.00 | 14.90 |
| 10 | 0.00 | 1.40 | 0.00 | 0.00 | 0.00 | 12.10 | 1.60 | 0.00 | 1.40 | 0.00 | 1.70 | 11.60 |
| 11 | 0.00 | 0.00 | 5.10 | 0.00 | 0.00 | 41.10 | 0.80 | 0.00 | 1.20 | 0.00 | 0.10 | 3.70 |
| 12 | 0.00 | 5.60 | 4.00 | 1.20 | 0.00 | 0.30 | 0.20 | 0.00 | 3.00 | 0.00 | 30.60 | 0.00 |
| 13 | 0.00 | 0.00 | 14.20 | 0.10 | 0.00 | 0.90 | 6.00 | 0.20 | 4.40 | 0.00 | 22.40 | 0.00 |
| 14 | 0.00 | 0.00 | 7.00 | 0.00 | 10.40 | 1.40 | 19.00 | 0.00 | 2.80 | 0.00 | 0.00 | 0.00 |
| 15 | 0.00 | 0.00 | 0.00 | 0.00 | 2.40 | 3.00 | 0.20 | 0.00 | 0.00 | 0.00 | 14.60 | 0.00 |
| 16 | 0.00 | 0.00 | 0.00 | 0.00 | 3.50 | 2.80 | 1.20 | 12.60 | 0.00 | 0.00 | 1.90 | 0.10 |
| 17 | 0.00 | 0.00 | 0.00 | 6.20 | 0.00 | 0.00 | 0.00 | 3.00 | 2.20 | 0.00 | 0.20 | 0.00 |
| 18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.30 | 0.00 | 4.40 | 0.20 | 0.00 | 0.00 | 0.00 |
| 19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.20 | 0.00 | 9.60 | 0.60 | 1.40 | 2.20 | 0.00 |
| 20 | 0.00 | 2.00 | 0.00 | 6.90 | 16.00 | 0.00 | 0.60 | 0.00 | 1.20 | 7.40 | 12.00 | 29.70 |
| 21 | 0.00 | 1.80 | 0.00 | 1.60 | 0.80 | 1.30 | 0.40 | 0.40 | 1.40 | 1.20 | 0.00 | 22.40 |
| 22 | 0.00 | 0.10 | 0.00 | 6.90 | 0.70 | 0.00 | 1.40 | 0.00 | 0.00 | 0.80 | 11.10 | 0.50 |
| 23 | 0.00 | 9.00 | 0.00 | 0.00 | 0.00 | 0.90 | 2.00 | 8.80 | 2.40 | 0.00 | 5.90 | 3.20 |
| 24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 0.20 | 0.20 | 0.00 | 0.10 |
| 25 | 25.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 2.60 | 0.00 | 0.00 | 2.00 | 5.30 | 0.00 |
| 26 | 0.40 | 0.00 | 0.00 | 0.20 | 0.00 | 3.80 | 0.00 | 14.60 | 0.00 | 1.00 | 8.00 | 0.00 |
| 27 | 6.70 | 0.30 | 0.00 | 0.00 | 17.50 | 21.70 | 0.00 | 12.40 | 11.80 | 0.00 | 0.10 | 0.00 |
| 28 | 1.30 | 5.00 | 0.00 | 0.00 | 3.70 | 0.10 | 0.00 | 0.20 | 2.40 | 0.00 | 0.00 | 0.00 |
| 29 | 0.70 | 0.10 | 0.00 | 0.00 | 7.60 | 0.00 | 0.00 | 3.20 | 2.50 | 0.00 | 8.10 | 0.00 |
| 30 | 12.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 1410 | 0.00 |
| 31 | | 0.00 | 0.00 | | 1.50 | | 0.00 | 0.00 | | 0.20 | | 0.00 |
| Total | 51.70 | 31.60 | 73.60 | 25.30 | 125.60 | 136.50 | 45.40 | 80.20 | 52.70 | 38.40 | 139.50 | 108.60 |

Kintore Creek Paired Watersheds

Air Temperature Data (June 1, 1995 - May 31, 1996)

| Day | June | | | July | | | August | | | September | | | October | | | November | | |
|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|-------------|--------------|--------------|
| | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean |
| 1 | 26.18 | 11.68 | 18.68 | 22.32 | 11.43 | 18.17 | 30.57 | 17.92 | 22.85 | 21.51 | 9.06 | 15.50 | 23.11 | 11.33 | 17.24 | 8.14 | 3.63 | 5.71 |
| 2 | 21.33 | 16.40 | 18.65 | 17.79 | 9.70 | 13.81 | 24.90 | 16.93 | 20.30 | 22.64 | 7.44 | 15.32 | 21.82 | 6.03 | 13.86 | 17.69 | 7.36 | 14.07 |
| 3 | 22.94 | 15.45 | 18.24 | 22.48 | 8.95 | 16.41 | 25.25 | 18.19 | 21.19 | 25.33 | 12.33 | 18.33 | 11.22 | 4.66 | 8.61 | 8.93 | -1.84 | 1.86 |
| 4 | 24.87 | 12.31 | 18.60 | 26.54 | 13.49 | 20.49 | 26.85 | 19.81 | 22.76 | 24.54 | 11.92 | 17.64 | 15.60 | 10.04 | 12.40 | 2.71 | -2.87 | -1.21 |
| 5 | 26.01 | 12.27 | 19.46 | 28.62 | 20.10 | 24.17 | 25.66 | 18.50 | 21.73 | 28.20 | 11.28 | 19.74 | 12.87 | 10.40 | 11.77 | 2.55 | 4.75 | -1.93 |
| 6 | 27.81 | 13.31 | 20.85 | 25.35 | 18.77 | 22.36 | 25.17 | 17.06 | 20.25 | 28.02 | 15.78 | 20.65 | 14.70 | 10.87 | 12.90 | 5.46 | -5.07 | 0.66 |
| 7 | 27.85 | 13.72 | 21.23 | 20.08 | 11.79 | 16.57 | 24.50 | 16.26 | 20.03 | 22.34 | 6.54 | 16.49 | 14.92 | 8.09 | 11.64 | 5.49 | -0.20 | 3.69 |
| 8 | 14.78 | 8.90 | 11.78 | 16.40 | 8.69 | 12.07 | 24.82 | 17.18 | 20.40 | 16.03 | 5.65 | 9.67 | 12.28 | 4.37 | 8.83 | 0.11 | -6.07 | -2.82 |
| 9 | 19.53 | 8.95 | 14.90 | 21.92 | 10.42 | 16.61 | 24.77 | 17.02 | 20.70 | 19.56 | 3.40 | 11.51 | 16.21 | 4.82 | 10.22 | -0.23 | -6.34 | -3.90 |
| 10 | 26.15 | 12.73 | 18.28 | 24.30 | 11.10 | 17.70 | 28.36 | 17.22 | 22.18 | 16.33 | 1.06 | 8.96 | 20.99 | 7.89 | 13.09 | 8.92 | -0.22 | 5.51 |
| 11 | 18.44 | 10.72 | 15.46 | 24.80 | 13.40 | 19.10 | 29.48 | 18.81 | 24.09 | 21.74 | 3.63 | 12.64 | 21.53 | 5.62 | 13.23 | 11.65 | -2.45 | 5.59 |
| 12 | 20.04 | 7.95 | 13.94 | 27.00 | 11.50 | 19.30 | 26.91 | 14.51 | 22.36 | 25.46 | 8.70 | 17.87 | 26.34 | 12.98 | 17.25 | -2.11 | 4.53 | -3.55 |
| 13 | 24.16 | 6.32 | 16.27 | 31.60 | 18.30 | 25.00 | 26.17 | 13.10 | 19.86 | 24.18 | 18.08 | 20.53 | 24.54 | 10.73 | 16.94 | -0.87 | 4.36 | -2.89 |
| 14 | 24.64 | 11.07 | 18.34 | 35.00 | 21.20 | 28.10 | 30.81 | 19.17 | 24.19 | 19.52 | 6.68 | 15.21 | 16.88 | 6.63 | 12.68 | 0.47 | -8.38 | -2.07 |
| 15 | 25.08 | 11.39 | 17.90 | 31.80 | 21.10 | 26.50 | 29.38 | 18.53 | 24.21 | 18.08 | 4.45 | 10.53 | 10.39 | 3.44 | 6.38 | 0.07 | -3.49 | -1.75 |
| 16 | 27.66 | 10.87 | 19.50 | 28.90 | 21.10 | 25.00 | 28.23 | 18.44 | 22.96 | 24.40 | 7.06 | 16.58 | 11.34 | -0.55 | 5.50 | -0.31 | 4.81 | -2.75 |
| 17 | 30.64 | 13.76 | 22.18 | 27.30 | 21.40 | 24.40 | 27.75 | 19.02 | 23.03 | 19.06 | 5.62 | 14.66 | 14.37 | -2.20 | 7.96 | 1.42 | -9.79 | -3.35 |
| 18 | 31.82 | 16.70 | 24.76 | 23.25 | 21.40 | 24.20 | 29.98 | 20.01 | 24.32 | 17.64 | 2.44 | 9.57 | 18.67 | 6.24 | 12.98 | 0.46 | -0.64 | -0.12 |
| 19 | 33.73 | 19.57 | 26.54 | 23.72 | 13.76 | 18.86 | 28.94 | 16.69 | 22.64 | 19.65 | 3.69 | 12.28 | 18.66 | 6.16 | 10.84 | 1.11 | -2.93 | -0.41 |
| 20 | 33.23 | 19.39 | 25.63 | 22.28 | 17.61 | 20.13 | 30.06 | 15.28 | 22.54 | 13.75 | 10.85 | 12.36 | 20.75 | 6.33 | 12.80 | 4.28 | 0.03 | 2.08 |
| 21 | 28.11 | 16.86 | 22.03 | 28.09 | 17.28 | 21.47 | 27.77 | 13.82 | 20.83 | 18.19 | 10.96 | 13.75 | 7.43 | 3.14 | 5.67 | 1.88 | -1.92 | -0.50 |
| 22 | 29.17 | 16.19 | 22.50 | 27.04 | 17.07 | 21.93 | 22.14 | 9.89 | 16.11 | 11.56 | 4.18 | 8.41 | 10.87 | 2.61 | 6.43 | -1.13 | -3.53 | -2.55 |
| 23 | 28.69 | 17.68 | 22.64 | 25.55 | 16.56 | 21.16 | 25.27 | 9.00 | 18.18 | 12.45 | -0.54 | 5.97 | 19.23 | 3.29 | 11.84 | 0.23 | -5.09 | -2.12 |
| 24 | 27.85 | 17.15 | 22.05 | 25.22 | 15.99 | 20.84 | 22.14 | 14.08 | 18.43 | 15.25 | 2.29 | 8.16 | 14.78 | 5.77 | 9.57 | -1.91 | -9.30 | -5.68 |
| 25 | 28.11 | 18.41 | 21.24 | 27.16 | 19.84 | 22.72 | 23.11 | 11.09 | 16.08 | 16.19 | 5.64 | 10.47 | 10.44 | 3.44 | 5.91 | 1.54 | -8.24 | -1.19 |
| 26 | 27.61 | 18.74 | 22.21 | 28.93 | 17.88 | 22.53 | 27.52 | 11.74 | 19.62 | 19.68 | 6.82 | 12.68 | 12.82 | 2.58 | 8.08 | 2.61 | -1.71 | 0.20 |
| 27 | 24.19 | 19.18 | 21.09 | 28.05 | 17.91 | 22.59 | 20.34 | 14.49 | 18.06 | 22.29 | 6.96 | 14.29 | 13.01 | 7.07 | 10.70 | 2.81 | 0.06 | 1.01 |
| 28 | 25.92 | 18.53 | 21.39 | 27.70 | 19.89 | 23.28 | 26.51 | 13.57 | 18.65 | 20.33 | 5.32 | 12.60 | 9.92 | 3.92 | 7.03 | 7.25 | -7.17 | -3.63 |
| 29 | 26.23 | 18.42 | 21.60 | 28.50 | 15.50 | 22.13 | 27.30 | 14.77 | 19.67 | 25.75 | 7.75 | 15.34 | 6.09 | 0.55 | 3.69 | -2.07 | -9.15 | -5.02 |
| 30 | 25.15 | 18.29 | 20.66 | 29.60 | 12.32 | 20.83 | 26.97 | 12.92 | 19.61 | 22.88 | 11.87 | 16.68 | 7.76 | 0.54 | 3.98 | 1.22 | 4.92 | -1.71 |
| 31 | | | | 31.85 | 13.05 | 22.48 | 29.36 | 13.46 | 22.00 | | | | 4.15 | 0.80 | 2.99 | | | |
| Ave | 25.93 | 14.43 | 19.95 | 26.10 | 15.76 | 21.00 | 26.69 | 15.76 | 20.96 | 20.42 | 7.23 | 13.91 | 14.96 | 5.41 | 10.10 | 2.95 | -3.62 | -0.29 |

Kintore Creek Paired Watersheds

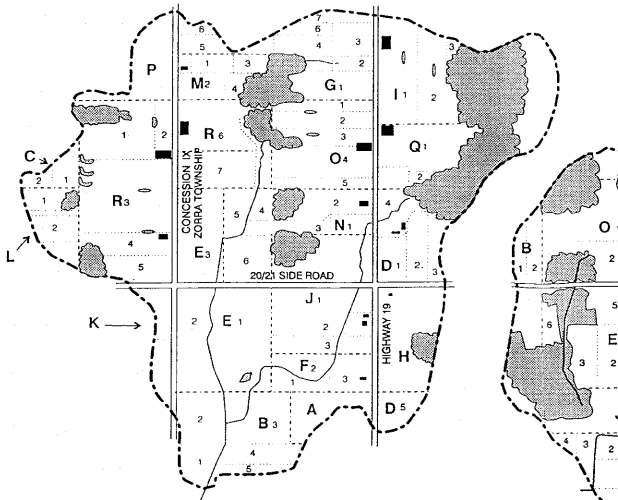
Air Temperature Data (June 1, 1995 -May 31, 1996)

A-4

| Day | December | | | January | | | February | | | March | | | April | | | May | | |
|-----|----------|--------|--------------|--------------|---------------|--------------|--------------|---------------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|
| | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean |
| 1 | 4.23 | -1.39 | 2.17 | -0.39 | -6.51 | -2.43 | -10.68 | -19.94 | -15.36 | -3.29 | -12.22 | -7.16 | 5.57 | -2.80 | 0.63 | 12.38 | 0.41 | 6.56 |
| 2 | -0.93 | -3.12 | -1.67 | -6.50 | -13.53 | -10.61 | -13.84 | -21.94 | -18.60 | -0.60 | -8.85 | -3.63 | 5.08 | 4.60 | -0.41 | 16.21 | -0.92 | 8.23 |
| 3 | 5.72 | -1.53 | 1.91 | -11.23 | -19.68 | -14.21 | -16.13 | -23.51 | -19.93 | -7.98 | -14.86 | -10.88 | 2.84 | -1.27 | 0.27 | 12.14 | 3.02 | 8.13 |
| 4 | 1.91 | -3.60 | -0.32 | -12.12 | -21.95 | -16.27 | -14.91 | -24.76 | -19.81 | -3.70 | -14.28 | -7.95 | -1.04 | 4.07 | -2.76 | 11.55 | 4.45 | 8.39 |
| 5 | 3.85 | -3.50 | -0.22 | -10.07 | -19.38 | -13.84 | -11.51 | -20.04 | -15.75 | -1.07 | -6.16 | -3.87 | 0.73 | 4.79 | -2.62 | 12.32 | 1.65 | 7.60 |
| 6 | -2.48 | -5.94 | 4.49 | -9.39 | -18.85 | -13.67 | -8.31 | -18.03 | -13.48 | -4.42 | -12.53 | -8.02 | 0.85 | -5.32 | -2.36 | 14.56 | 4.58 | 9.22 |
| 7 | -5.81 | -11.10 | -7.88 | -11.04 | -18.14 | -13.53 | 1.50 | -9.58 | -2.03 | -12.07 | -20.78 | -15.28 | -0.22 | -5.47 | -3.08 | 13.34 | 3.91 | 9.05 |
| 8 | -3.10 | -11.33 | -6.09 | -6.44 | -18.10 | -11.92 | 3.12 | -0.45 | 1.62 | -10.69 | -20.13 | -15.61 | 0.93 | -6.74 | -3.00 | 17.17 | 4.15 | 10.47 |
| 9 | -1.93 | -17.81 | -10.36 | 4.38 | -9.60 | -7.80 | 0.62 | -1.30 | -0.29 | -7.87 | -20.33 | -14.15 | 2.47 | -8.50 | -1.74 | 17.21 | 8.07 | 12.64 |
| 10 | -11.79 | -17.39 | -14.07 | -6.59 | -21.30 | -13.29 | 5.93 | -1.34 | 2.14 | -2.87 | -15.30 | -9.11 | 7.78 | 4.50 | 1.88 | 20.81 | 6.42 | 13.79 |
| 11 | -12.48 | -16.12 | -13.77 | -9.33 | -16.98 | -11.89 | 3.54 | -11.67 | -3.14 | 1.52 | -9.99 | 4.37 | 18.28 | -0.38 | 9.83 | 6.46 | 0.72 | 4.33 |
| 12 | -8.33 | -15.27 | -12.69 | -1.14 | -12.11 | -8.77 | -11.01 | -16.08 | -13.26 | 6.13 | -6.76 | -0.43 | 13.73 | 4.00 | 7.51 | 6.83 | -0.39 | 3.14 |
| 13 | -5.51 | -15.83 | -9.48 | -1.05 | -8.62 | -3.50 | -6.67 | -19.84 | -11.64 | 7.96 | -1.48 | 2.74 | 4.06 | -0.56 | 1.36 | 9.76 | -1.00 | 4.49 |
| 14 | 3.65 | -7.53 | -0.89 | 0.73 | -7.23 | -1.54 | -4.40 | -8.41 | -6.41 | 10.59 | 0.22 | 4.50 | 8.86 | -1.04 | 2.71 | 14.37 | 0.29 | 8.04 |
| 15 | 0.58 | -0.19 | 0.24 | -7.23 | -16.10 | -13.01 | -6.24 | -15.48 | -9.87 | 1.29 | -5.33 | -1.18 | 9.59 | 1.35 | 5.36 | 15.52 | 5.34 | 10.69 |
| 16 | -0.06 | -4.26 | -2.47 | 4.55 | -14.11 | -4.55 | -6.36 | -19.01 | -13.04 | 2.00 | -7.64 | -3.15 | 4.258 | -0.14 | 1.35 | 14.31 | 7.85 | 11.12 |
| 17 | -2.58 | -8.86 | -5.59 | 6.02 | 3.35 | 4.52 | -5.62 | 16.53 | -10.19 | 5.14 | -4.48 | -0.12 | 7.58 | -0.07 | 3.00 | 22.60 | 10.43 | 15.38 |
| 18 | -3.08 | -7.75 | -5.69 | 12.48 | 5.11 | 8.96 | -10.21 | -17.98 | -13.36 | 6.28 | -2.48 | 1.17 | 18.96 | 0.79 | 10.00 | 29.03 | 14.12 | 22.13 |
| 19 | -7.11 | -12.85 | -9.86 | 8.14 | -10.54 | 4.61 | 1.23 | -12.96 | -5.32 | 10.25 | -0.01 | 4.90 | 20.89 | 9.26 | 15.52 | 28.69 | 17.84 | 23.88 |
| 20 | -6.73 | -15.13 | -10.86 | -6.49 | -11.26 | -9.88 | 3.88 | 1.02 | 2.58 | 0.65 | -3.61 | -0.85 | 19.43 | 9.86 | 14.55 | 28.04 | 16.42 | 21.29 |
| 21 | -5.45 | -13.41 | -8.03 | -4.48 | -9.36 | -6.87 | 4.65 | 1.21 | 3.01 | -3.56 | -8.03 | -6.32 | 14.33 | 5.06 | 9.47 | 20.16 | 12.08 | 16.53 |
| 22 | -3.44 | -7.67 | 4.84 | 2.81 | -7.56 | -0.97 | 3.80 | 0.54 | 1.61 | -2.25 | -7.14 | 4.75 | 13.63 | 5.23 | 8.61 | 21.10 | 10.00 | 14.74 |
| 23 | -2.89 | -4.63 | -3.85 | 1.15 | -0.27 | 0.18 | 4.34 | -0.25 | 1.74 | 0.80 | -8.59 | -3.58 | 8.02 | -0.79 | 2.29 | 19.96 | 11.55 | 14.37 |
| 24 | -3.96 | -5.78 | 4.88 | 3.17 | -8.53 | -2.65 | 8.02 | 1.40 | 3.80 | 4.77 | -7.53 | -0.50 | 12.61 | -2.68 | 3.88 | 15.80 | 6.63 | 11.52 |
| 25 | -3.42 | -9.78 | -6.04 | -5.29 | -10.73 | -8.03 | 8.75 | -0.31 | 3.67 | 10.68 | 4.15 | 4.77 | 16.59 | 1.13 | 9.51 | 16.99 | 5.39 | 12.05 |
| 26 | -6.99 | -17.08 | -10.97 | 1.97 | -5.70 | -1.54 | 6.95 | -0.12 | 2.54 | 4.08 | -12.09 | -7.25 | 13.39 | -1.44 | 6.39 | 17.26 | 8.99 | 12.41 |
| 27 | -6.11 | -18.20 | -9.50 | 5.46 | -6.84 | -3.11 | 1.62 | -0.74 | 0.31 | -2.41 | -12.16 | -7.08 | 6.94 | -2.72 | 1.60 | 17.99 | 7.53 | 13.51 |
| 28 | -3.55 | -9.31 | -6.50 | 4.61 | -9.94 | -7.43 | 3.26 | -10.20 | 4.06 | 3.61 | -6.32 | -1.75 | 11.67 | -2.47 | 5.80 | 20.39 | 9.22 | 14.72 |
| 29 | 4.07 | -8.48 | -6.85 | 0.85 | -10.09 | -5.65 | -6.64 | -13.34 | -10.21 | 8.82 | -1.89 | 2.63 | 10.13 | 3.57 | 6.29 | 16.66 | 6.03 | 11.02 |
| 30 | -2.47 | -8.37 | -5.46 | -10.05 | -14.23 | -11.89 | | | | 9.86 | -1.23 | 3.30 | 8.45 | 2.71 | 5.58 | 19.43 | 3.36 | 11.90 |
| 31 | 0.26 | -4.20 | -1.56 | -11.85 | -18.95 | -15.01 | | | | 12.88 | 0.04 | 5.18 | | | | 22.19 | 3.47 | 13.85 |
| Avg | -3.03 | -9.27 | -5.82 | -2.98 | -11.54 | -7.25 | -2.46 | -10.33 | -6.30 | 1.17 | -8.26 | -3.48 | 8.85 | -0.84 | 3.77 | 13.43 | 3.03 | 9.49 |

KINTORE PAIRED WATERSHEDS

WESTERN PAIRED WATERSHED 1995 FIELD BOUNDARIES



BERM

WOODLOT

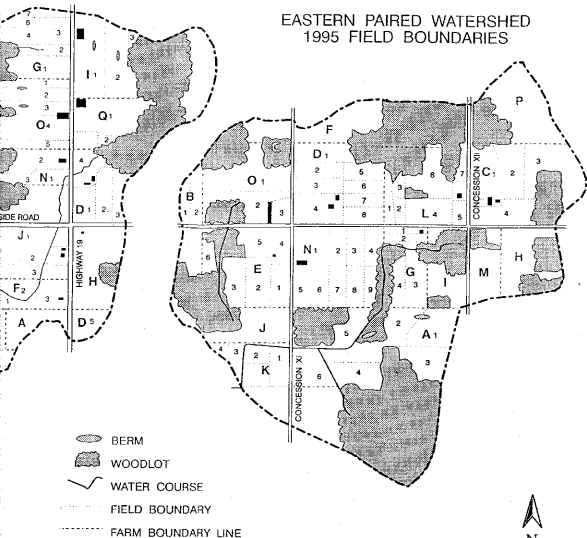
WATER COURSE

FIELD BOUNDARY

FARM BOUNDARY LINE

KINTORE PAIRED WATERSHEDS

EASTERN PAIRED WATERSHED 1995 FIELD BOUNDARIES



Kintore - 1995 Field Activities - Western Sub-basin

| Landowner | Field # | Acres | Primary Tillage (95/96) | 1995 Crop |
|-----------|---------|-------|-------------------------|--------------|
| Farm A | 1 | 24 | fall mouldboard | corn |
| Farm B | 1 | 20 | spring mouldboard. | corn |
| | 2 | 24 | fall chisel plow | spring grain |
| | 3 | 36 | spring mouldboard | winter wheat |
| | 4 | 15 | spring mouldboard | corn |
| | 5 | 15 | spring mouldboard | corn |
| Farm C | 1 | 10 | fall mouldboard | spring grain |
| | .2 | 7 | spring mouldboard | corn |
| Farm D | 1 | 20 | fall mouldboard | corn |
| | 2 | 26 | fall mouldboard | corn |
| | 3 | 10 | spring mouldboard | s. beans |
| | 4 | 10 | --- | idle |
| | 5 | 21 | fall mouldboard | s. beans |
| Farm E | 1 | 49 | spring chisel plow | spring grain |
| | 2 | 40 | fall chisel plow | corn |
| | 3 | 47 | fall chisel plow | corn |
| Farm F | 1 | 14 | --- | alfalfa |
| | 2 | 6 | --- | alfalfa |
| | 3 | 8 | --- | alfalfa |
| Farm G | 1 | 20 | --- | alfalfa |
| | 2 | 6 | --- | alfalfa |
| | 3 | 16 | fall mouldboard | alfalfa |
| | 4 | 13 | --- | alfalfa |
| | 5 | 13 | spring mouldboard | s. beans |
| | 6 | 23 | --- | alfalfa |
| Farm H | 1 | 10 | --- | tree nursery |
| Farm I | 1 | 50 | spring mouldboard. | corn |
| | 2 | 20 | spring mouldboard | s. beans |
| | 3 | 7 | spring mouldboard | corn |
| Farm J | 1 | 20 | no till | s. beans |
| | 2 | 22 | no till | s. beans |
| | 3 | 20 | fall mouldboard | s. beans |
| Farm K | 1 | 12 | f/spring mouldboard | corn |
| Farm L | 1 | 15 | spring mouldboard | s. beans |
| | 2 | 15 | spring mouldboard | s. beans |

| | | | | |
|--------|---|----|-------------------|----------|
| Farm M | 1 | 10 | | alfalfa |
| | 2 | 13 | --- | alfalfa |
| | 3 | 10 | spring mouldboard | Corn |
| | 4 | 7 | spring mouldboard | s. beans |
| Farm N | 1 | 8 | no till | s. beans |
| | 2 | 22 | spring mouldboard | Corn |
| | 3 | 10 | no till | s. beans |
| | 4 | 6 | fall mouldboard | alfalfa |
| | 5 | 12 | no till | Corn |
| | 6 | 30 | no till | Corn |
| Farm O | 1 | 11 | spring mouldboard | Corn |
| | 2 | 14 | fall mouldboard | Corn |
| | 3 | 18 | fall mouldboard | s. beans |
| | 4 | 31 | fall mouldboard | Corn |
| | 5 | 14 | spring mouldboard | s. beans |

Kintore - 1995 Field Activities, Eastern Sub-basin

B-4

| Landowner | Field # | Acres | Primary Tillage (95/96) | 1995 Crop |
|-----------|---------|-------|-------------------------|--------------|
| Farm A | 1 | 30 | spring chisel plow | s.beans |
| | 2 | 15 | spring chisel plow | corn |
| | 3 | 25 | no-till | corn |
| | 4 | 34 | spring chisel plow | s.beans |
| | 5 | 14 | fall chisel plow | alfalfa |
| | 6 | 18 | spring chisel plow | corn |
| Farm B | 1 | 8 | spring mouldboard | s.beans |
| | 2 | 10 | fall mouldboard | corn |
| Farm C | 1 | 26 | no till | spring grain |
| | 2 | 15 | no till | corn |
| | 3 | 20 | fall mouldboard | s.beans |
| | 4 | 21 | --- | alfalfa a |
| Farm D | 1 | 14 | spring mouldboard | alfalfa |
| | 2 | 13 | --- | alfalfa |
| | 3 | 12 | --- | alfalfa |
| | 4 | 20 | spring mouldboard | corn |
| | 5 | 12 | fall chisel plow | spring grain |
| | 6 | 7 | fall chisel plow | corn |
| | 7 | 7 | --- | alfalfa |
| | 8 | 13 | fall chisel plow | corn |
| Farm E | 1 | 14 | --- | alfalfa |
| | 2 | 24 | --- | alfalfa |
| | 3 | 11 | --- | alfalfa |
| | 4 | 2 | --- | alfalfa |
| | 5 | 14 | --- | alfalfa |
| | 6 | 5 | --- | alfalfa a |
| Farm F | 1 | 23 | spring mouldboard | corn |
| Farm G | 1 | 3 | spring mouldboard | corn |
| | 2 | 7 | spring mouldboard | corn |
| | 3 | 18 | spring mouldboard | corn |
| | 4 | 7 | -.Pnng mouldboard | corn |
| Farm H | 1 | 25 | spring mouldboard | corn |
| Farm I | 1 | 17 | spring mouldboard | corn |
| Farm J | 1 | 42 | spring mouldboard | s.beans |
| Farm K | 1 | 4 | --- | alfalfa |
| | 2 | 4 | --- | alfalfa |
| | 3 | 3 | --- | alfalfa |
| | 4 | 2 | fall mouldboard | s.beans |

| | | | | |
|--------|---|----|-------------------|--------------|
| Farm L | 1 | 9 | fall mouldboard | corn |
| | 2 | 3 | fall mouldboard | corn |
| | 3 | 3 | fall mouldboard | corn |
| | 4 | 20 | fall mouldboard | corn |
| | 5 | 4 | fall mouldboard | corn |
| | 6 | 20 | fall mouldboard | corn |
| | 7 | 4 | fall mouldboard | corn |
| Farm M | 1 | 28 | fall mouldboard | s. beans |
| Farm N | 1 | 16 | --- | alfalfa |
| | 2 | 11 | spring mouldboard | corn |
| | 3 | 10 | no till | spring grain |
| | 4 | 10 | --- | alfalfa |
| | 5 | 11 | --- | alfalfa |
| | 6 | 11 | --- | alfalfa |
| | 7 | 8 | --- | alfalfa |
| | 8 | 9 | spring mouldboard | corn |
| | 9 | 9 | --- | alfalfa a |
| Farm O | 1 | 49 | fall mouldboard | corn |
| | 2 | 15 | --- | alfalfa |
| | 3 | 8 | --- | alfalfa |
| Farm P | 1 | 10 | spring mouldboard | s. beans |
| | 2 | 8 | spring mouldboard | spring grain |

Kintore Creek Routine Grab Samples

C-1

Station 1 (Western subwatershed)

| Date of Sample | Julian Date | Time | Staff Gauge (m) | Temp (C) | Suspended Solids (mg/L) | Nitrogen | | | | Phosphorus | | pH | Conductivity (µs/cm @ 25 °C) | Chloride (mg/L) | Potassium (mg/L) | Sodium (mg/L) |
|----------------|-------------|-------|-----------------|----------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------|---------------------------|------|------------------------------|-----------------|------------------|---------------|
| | | | | | | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrite (mg/L) | Nitrate (mg/L) | Total (mg/L) | Dissolved Reactive (mg/L) | | | | | |
| 01 -June-95 | 152 | 12:15 | 0.298 | 15 | 5 | 0.07 | 0.69 | 0.03 | 9.4 | 0.04 | 0.01 | 8.24 | 641 | 23.8 | 1.67 | 8.1 |
| 08-June-95 | 159 | 9:30 | 0.26 | 11 | 11.7 | 0.27 | | 0.03 | 7.5 | | 0.02 | 8.27 | 638 | 20.5 | 1.14 | 6.1 |
| 15-June-95 | 166 | 13:45 | 0.248 | 19 | 19.9 | 0.29 | 2.34 | 0.05 | 6.5 | 0.17 | 0.06 | 8.38 | 622 | 17.2 | 1.68 | 6.5 |
| 22-June-95 | 173 | 12:30 | 0.248 | 20 | 16 | 0.07 | 0.52 | 0.03 | 6.7 | 0.04 | 0.01 | 8.29 | 627 | 17.4 | 1.03 | 5.1 |
| 27-June-95 | 178 | 9:15 | 0.259 | is | 5 | 0.07 | 0.64 | 0.02 | 5.5 | 0.03 | 0.01 | 8.18 | 619 | 17.4 | 1.4 | 5.4 |
| 13-July-95 | 194 | 11:30 | 0.24 | 19 | 36.8 | 0.06 | | 0.02 | 5.7 | | 0.01 | 8.13 | 581 | 17 | 1.18 | 5 |
| 20-July-95 | 201 | 14:10 | 0.248 | 19 | 13.3 | 0.18 | 0.99 | 0.04 | 5.2 | 0.05 | 0.01 | 8.3 | 593 | 16.5 | 1.88 | 5.5 |
| 27-July-95 | 208 | 11:45 | 0.235 | 19 | 19.7 | 0.05 | 0.5 | 0.04 | 5.1 | 0.03 | 0.01 | 8.17 | 583 | 15.8 | 1.07 | 4.8 |
| 03-Aug-95 | 215 | 13:00 | 0.245 | 18 | 5 | 0.05 | 0.42 | 0.03 | 5.7 | 0.05 | 0.01 | 8.25 | 589 | 14.7 | 1.57 | 5.2 |
| 11-Aug-95 | 223 | 12:25 | 0.254 | 22 | 5 | 0.14 | 0.58 | 0.03 | 5.1 | 0.06 | 0.01 | 8.4 | 606 | 15.3 | 2.37 | 8.2 |
| 21-Aug-95 | 233 | 10:35 | 0.23 | 18 | 5 | 0.08 | 0.7 | 0.25 | 5.5 | 0.06 | 0.01 | 8.21 | 622 | 15.7 | 2.3 | 5.5 |
| 28-Aug-95 | 240 | 9:28 | 0.125 | 19 | 6.8 | 0.05 | 0.66 | 0.2 | 5.3 | 0.06 | 0.02 | 8.25 | 612 | 10.2 | 2.07 | 4.9 |
| 06-Sept-95 | 249 | 9:45 | 0.218 | 17 | 5 | 0.05 | 0.31 | 0.01 | 5 | 0.03 | 0.01 | 8.3 | 597 | 13.2 | 1.33 | 4.3 |
| 14-Sept-95 | 257 | 9:50 | 0.22 | is | 7.9 | 0.05 | 0.53 | 0.02 | 5.93 | 0.06 | 0.04 | 8.29 | 595 | 13.9 | 1.33 | 4.5 |
| 19-Sept-95 | 262 | 11:30 | 0.22 | 14 | 20.4 | 0.05 | 0.48 | 0.02 | 4.8 | 0.02 | 0.01 | 8.34 | 596 | 14.4 | 1.3 | 4.3 |
| 26-Sept-95 | 269 | 9:34 | 0.225 | 12 | 23.5 | 0.05 | 0.58 | 0.02 | 5.1 | 0.02 | 0.01 | 8.25 | 603 | 13.9 | 1.37 | 4.9 |
| 04-Oct-95 | 277 | 9:35 | 0.283 | 13 | 5.8 | 0.4 | 0.81 | 0.05 | 4.4 | 0.03 | 0.01 | 8.23 | 623 | 16.2 | 3.12 | 5.3 |
| 06-Oct-95 | 279 | 9:35 | 0.31 | 13 | 9.9 | 0.86 | 239 | 0.32 | 7.48 | 0.19 | 0.1 | 8 | 727 | 42.9 | 8.87 | 15.8 |
| 11 -Oct-95 | 284 | 10:00 | 0.24 | 11 | 7.5 | 0.15 | 0.47 | 0.02 | 4.89 | 0.03 | 0.01 | 8.2 | 633 | 18.1 | 1.66 | 6.1 |
| 20-Oct-95 | 293 | 9:40 | 0.24 | 12 | 14.5 | 0.16 | 0.48 | 0.02 | 4.8 | 0.02 | 0.01 | 8.2 | 823 | 10.3 | 1.58 | 6 |
| 24-Oct-95 | 297 | 9:38 | 0.25 | 12 | 7 | 0.1 | 0.57 | 0.03 | 4.6 | 0.01 | 0.01 | 8.18 | 654 | 20.1 | 2.04 | 7.5 |
| 31-Oct-95 | 304 | 9:30 | 0.27 | 9 | 1.7 | 0.22 | 0.79 | 0.06 | 6 | 0.06 | 0.01 | 8.14 | 718 | 30.4 | 2.7 | 10.8 |
| 03-Nov-95 | 307 | 10:35 | 0.35 | 9 | 3.8 | 0.53 | 1.33 | 0.06 | 12.2 | 0.12 | 0.01 | 7.92 | 741 | 44.1 | 4.02 | 14.7 |
| 07-Nov-95 | 311 | 9:20 | 0.295 | 9 | 11.8 | 0.16 | 0.7 | 0.02 | 5.5 | 0.06 | 0.01 | 8.09 | 667 | 31.7 | 2.18 | 11.6 |
| 13-Nov-95 | 317 | 10:35 | 0.415 | 8 | 8.4 | 0.15 | 0.75 | 0.03 | 15.6 | 0.03 | 0.01 | 7.75 | 673 | 35.8 | 2.71 | 8.5 |
| 21 -Nov-95 | 325 | 9:22 | 0.385 | 7 | 3.2 | 0.28 | 0.99 | 0.04 | 14.6 | 0.08 | 0.03 | 8 | 700 | 37.8 | 2.65 | 11.7 |
| 28-Nov-95 | 332 | 10:39 | 0.61 | 6 | 15.3 | 0.37 | 1.32 | 0.05 | 22 | 0.17 | 0.03 | 7.8 | 812 | 30.9 | 3.22 | 8.8 |
| 07-Dec-95 | 341 | 9:30 | 0.3 | 4 | 2.8 | 0.15 | 0.54 | 0.02 | 11.8 | 0.04 | 0.03 | 8.03 | 690 | 30.5 | 1.51 | 9.2 |
| 18-Dec-95 | 352 | 10:05 | 0.295 | 2 | 1.5 | 0.19 | 0.45 | 0.03 | 9.4 | 0.04 | 0.02 | 8.25 | 680 | 31 | 1.55 | 10.8 |
| 18-Jan-96 | 18 | 10:54 | 0.85 | 1 | 237 | 2.08 | 5.69 | 0.72 | 4.1 | 1.63 | 0.88 | 7.47 | 357 | 271 | 5.77 | 10.2 |
| 23-Jan-96 | 23 | 9:50 | 0.32 | 1 | 2.1 | 0.1 | 0.51 | 0.02 | 10.7 | 0.01 | 0.03 | 8.17 | 659 | 27.5 | 1.51 | 8.8 |
| 15-Feb-96 | 48 | 9:55 | 0.288 | 2 | 3.4 | 0.25 | 0.44 | 0.02 | 7.8 | 0.03 | 0.01 | 8.11 | 638 | 22.8 | 1.41 | 7.7 |
| 03-Apr-96 | 94 | 9:30 | 0.315 | 4 | 2.4 | 0.31 | 0.67 | 0.02 | 9 | 0.04 | 0.03 | 8.11 | 629 | 24.8 | 1.88 | 8.9 |
| 10-Apr-96 | 101 | 11:20 | 0.305 | 6 | 2.8 | 0.58 | 0.91 | 0.03 | 9.3 | 0.01 | 0.01 | 8.26 | 628 | 27.1 | 1.93 | 9.8 |
| 15-Apr-96 | 106 | 09:25 | 0.45 | 4 | 8.8 | 1.26 | 1.65 | 0.05 | 11 | 0.15 | 0.02 | 7.88 | 609 | 28.8 | 2.87 | 8.8 |

Kintore Creek Routine Grab Samples

C-2

Station 2 (Western subwatershed)

| Date of Sample | Julian Date | Time | Staff Gauge (m) | Temp °C | Suspended Solids (mg/L) | Nitrogen | | | | Phosphorus | | pH | Conductivity (µs/cm @ 25 °C) | Chloride (mg/L) | Potassium (mg/L) | Sodium (mg/L) |
|----------------|-------------|-------|-----------------|---------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------|---------------------------|-------|------------------------------|-----------------|------------------|---------------|
| | | | | | | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrite (mg/L) | Nitrate (mg/L) | Total (mg/L) | Dissolved Reactive (mg/L) | | | | | |
| 01-June-95 | 152 | 15:35 | 0.59 | 18 | 5 | 0.05 | 0.84 | 0.03 | 7.1 | 0.04 | 0.01 | 8.29 | 597 | 19 | 6.1 | 1.44 |
| 08-June-95 | 159 | 11:35 | 0.175 | 12 | 21.8 | 0.27 | 1.48 | 0.02 | 4.8 | 0.24 | 0.02 | 8.39 | 595 | 18.7 | 1.1 | a |
| 15-June-95 | 186 | 15:10 | 0.15 | 18 | 16.8 | 0.14 | 0.51 | 0.02 | 4.6 | 0.02 | 0.01 | 8.46 | 585 | 18. | 0.91 | 5.8 |
| 22-June-95 | 173 | 14:45 | 0.18 | 21 | 21.9 | 0.07 | | 0.02 | 4.5 | | 0.04 | 8.4 | 571 | 16.8. | 0.9 | 5.1 |
| 27-June-95 | 178. | 11:55 | 0.19 | is | 8..9 | 0.08 | 0.8.7 | 0.02 | 29 | 0.05 | 0.01 | 8.22 | 58.3 | 16.6 | 1.46 | 5.8 |
| 13-July-95 | 194 | 14:20 | 0.2 | 18 | 5 | 0.05 | 0.4 | 0.02 | 4.1 | 0.02 | 0.01 | 8.33 | 585 | 15.9 | 0.93 | 5.2 |
| 20-July-95 | 201 | 16:00 | 0.171 | 17 | 9.8 | 0.05 | 0.42 | 0.02 | 3.1 | 0.03 | 0.01 | 8.38 | 581 | 15.8 | 1.24 | 5.8 |
| 27-July-95 | 208 | 13:45 | 0.17 | 18 | 23.4 | 0.05 | 0.47 | 0.01 | 3.2 | 0.04 | 0.01 | 8.31 | 559 | 15 | 1.12 | 5.6 |
| 03-Aug-95 | 215 | 15:00 | 0.185 | | 5 | 0.05 | 0.48 | 0.02 | 2.4 | 0.03 | 0.01 | 8.22 | 571 | 16.3 | 1.73 | 5.2 |
| 11 -Aug-95 | 223 | 14:30 | 0.17 | 22 | 5 | 0.12 | 0.45 | 0.01 | 27 | 0.04 | 0.01 | 8.44 | 563 | 16.1 | 1.41 | 5.5 |
| 21 -Aug-95 | 233 | 13:45 | 0.171 | 19 | 6.2 | 0.05 | 0.42 | 0.02 | 29 | 0.03 | 0.01 | 8.35 | 571 | 14.8 | 1.02 | 4.9 |
| 28-Aug-95 | 240 | 11:50 | 0.17 | 17 | 15.4 | 0.1 | 0.38 | 0.01 | 2.2 | 0.02 | 0.01 | 8.4 | 571 | 15.6 | 0.97 | 4.8. |
| 08-Sept-95 | 249 | 12:40 | 0.18 | 18 | 9.5 | 0.05 | 0.3 | 0.01 | 25 | 0.03 | 0.01 | 8.41 | 549 | 13.4 | 1.11 | 4.8. |
| 14-Sept-95 | 257 | 13:20 | 0.195 | 16 | 14.9 | 0.08 | 0.45 | 0.01 | 2.48 | 0.02 | 0.01 | 8.43 | 548 | 13.4 | 0.91 | 4.7 |
| 19-Sept-95 | 282 | 14:50 | 0.19 | 15 | 10.8. | 0.05 | 0.38 | 0.02 | 2.4 | 0.03 | 0.01 | 8.38. | 562 | 13.1 | 1.04 | 4.2 |
| 26--Sept-95 | 269 | 11:55 | 0.21 | 13 | 43.7 | 0.05 | 0.57 | 0.01 | 24 | 0.01 | 0.01 | 8.22 | 620 | 13.4 | 1.08 | 4.7 |
| 04-Oct-95 | 277 | 14:50 | 0.215 | 14 | 5.9 | 0.1 | 0.4 | 0.01 | 2.2 | 0.01 | 0.01 | 8.35 | 569 | 14.3 | 1.38. | 4.7 |
| 08-Oct-95 | 279 | 11:50 | 0.255 | 14 | 11.4 | 0.05 | 1.17 | 0.04 | 8..37 | 0.08 | 0.01 | 8.14 | 701 | 38.4 | 5.82 | 12.2 |
| 11 -Oct-95 | 284 | 12:11 | 0.21 | 13 | 8..4 | 0.05 | 0.27 | 0.01 | 28. | 0.02 | 0.01 | 8.33 | 594 | 15.9 | 1.18 | 4.4 |
| 20-Oct-95 | 293 | 11:20 | 0.21 | 13 | 14.1 | 0.11 | 0.38 | 0.01 | 27 | 0.01 | 0.01 | 8.31 | 591 | 18.8 | 1.31 | 8..4 |
| 24-Oct-95 | 297 | 11:30 | 0.205 | 12 | 7.7 | 0.05 | 0.49 | 0.01 | 28 | 0.01 | 0.01 | 8.3 | 612 | 18.2 | 1.46 | 8.8 |
| 31-Oct-95 | 304 | 12:13 | 0.218 | 9 | 3.8 | 0.18. | 0.52 | 0.14 | 0.8 | 0.03 | 0.01 | 8-18 | 652 | 24.3 | 1.8.8. | 7.6 |
| 03-Nov-95 | 307 | 12:30 | 0.24 | 9 | 5 | 0.29 | 0.8. | 0.02 | 12.7 | 0.06 | 0.01 | 7.97 | 690 | 33 | 2.98. | 8..7 |
| 07-Nov-95 | 311 | 11:15 | 0.225 | 9 | 8..8. | 0.15 | 0.58 | 0.01 | 4.7 | 0.03 | 0.01 | 8.13 | 606 | 20.8 | 1.83 | 5.9 |
| 13-Nov-95 | 317 | 15:40 | 0.255 | 8 | 10.4 | 0.15 | 0.88 | 0.02 | 15.2 | 0.04 | 0.02 | 7.85 | 628 | 30.1 | 262 | 6.4 |
| 21 -Nov-95 | 325 | 11:40 | 0.24 | 7 | 2 | 0.05 | 0.71 | 0.02 | 15.4 | 0.01 | 0.01 | 8.08. | 677 | 31.9 | 247 | 7.5 |
| 28-Nov-95 | 332 | 13:30 | 0.285 | 7 | 14 | 0.05 | 0.88 | 0.02 | 21 | 0.07 | 0.01 | 7.71 | 833 | 31.3 | 2.82 | 8..4 |
| 07-Dec-95 | 341 | 13:25 | 0.195 | 3 | 1 | 0.12 | 0.44 | 0.02 | 9.9 | 0.02 | 0.01 | 8.21 | 633 | 24.4 | 1.51 | 8..2 |
| 18-Dec-95 | 352 | 12:20 | 0.195 | 2 | 2.1 | 0.1 | 0.44 | 0.02 | 8.1 | 0.03 | 0.01 | 8..33 | 623 | 22.5 | 1.34 | 6.4 |
| 18-Jan-96 | 18. | 12:05 | 0.38.5 | 1 | 417 | 0.8.2 | 4.72 | 0.02 | 5.3 | 1.04 | 0.15 | 7.8. | 268. | 127 | 4.8.2 | 4.2 |
| 23-Jan-96 | 23 | 10:35 | 0.21 | 1 | 2 | 0.09 | 0.58 | 0.01 | 9.5 | 0.01 | 0.01 | 8..22 | 812 | 21.4 | 1.47 | 8..3 |
| 15-Feb-96 | 48. | 12:05 | 0.205 | 4 | 3.9 | 0.23 | 0.42 | 0.02 | 5.6 | 0.01 | 0.01 | 8.16 | 578 | 18..7 | 1.27 | 5.9 |
| 03-Apr-96 | 94 | 10:00 | 0.225 | 4 | 3 | 0.07 | 0.4.9 | 0.02 | 7.8 | 0.01 | 0.01 | 8..08 | 584 | 18.8 | 1.81 | 6.4 |
| 10-Apr-96 | 101 | 12:13 | 0.625 | 9 | 8 | 0.69 | 0.46 | 0.03 | 7 | 0.01 | 0.01 | 8.22 | 589 | 20.4 | 1.61 | 6.3 |
| 15-Apr-96 | 108 | 12:00 | 0.25 | 6 | 7.1 | 0.38. | 0.77 | 0.03 | 11.1 | 0.04 | 0.01 | 8 | 582 | 21.8 | 2.56 | 5.9 |

Kintore Creek Routine Grab Samples

Station 3 (Western subwatershed)

| Nitrogen | | | | | Phosphorus | |
|----------|--|--|--|--|------------|--|
|----------|--|--|--|--|------------|--|

| Date of | Julian | Time | Staff | Temp | Suspended | Free | Total | Nitrite | Nitrate | Total | Dissolved | pH | Conductivity | Chloride | Potassium | Sodium |
|------------|--------|--------|-------|------|-----------|------|-------|---------|---------|-------|-----------|------|--------------|----------|-----------|--------|
| 01-June-95 | 152 | 15:15 | 0.21 | 17 | 12.3 | 0.05 | 0.73 | 0.02 | 7.2 | 0.04 | 0.01 | 8.35 | 598 | 14.1 | 1.33 | 7.4 |
| 08-June-95 | 159 | 11:15 | 0.06 | 12.5 | 34 | 0.27 | 0.69 | 0.05 | 7.3 | 0.05 | 0.03 | 8.3 | 625 | 12.5 | 0.95 | 5 |
| 15-June-95 | 168 | 15:01 | 0.59 | 18 | 40.6 | 0.11 | 0.84 | 0.02 | 7.7 | 0.04 | 0.01 | 8.34 | 615 | 9.8 | 0.78 | 4.4 |
| 22-June-95 | 173 | 14:25 | 0.58 | 18 | 59.6 | 0.14 | 0.83 | 0.02 | 8.1 | 0.05 | 0.02 | 8.35 | 622 | 10.8 | 0.87 | 3.7 |
| 27-June-95 | 178 | 11:35 | 0.52 | 16 | 62.7 | 0.07 | 0.99 | 0.01 | 5.5 | 0.09 | 0.01 | 8.25 | 815 | 14.7 | 2.26 | 6.7 |
| 13-July-95 | 194 | 14:05 | 0.57 | 17 | 55.8 | 0.05 | 0.83 | 0.02 | 8 | 0.05 | 0.01 | 8.08 | 605 | 11.4 | 1.22 | 4.1 |
| 20-July-95 | 201 | 15:50 | 0.58 | 16 | 59.3 | 0.05 | 0.9 | 0.01 | 7.4 | 0.07 | 0.01 | 8.27 | 621 | 11.1 | 1.98 | 4.4 |
| 27-July-95 | 208 | 13:35 | 0.58 | 18 | 102 | 0.05 | 1.66 | 0.01 | 8.1 | 0.17 | 0.01 | 8.08 | 596 | 11.3 | 1.52 | 4.4 |
| 03-Aug-95 | 215 | 14:50 | 0.64 | | 27.9 | 0.05 | 0.43 | 0.01 | 7.6 | 0.03 | 0.01 | 8.28 | 626 | 12.3 | 2.37 | 4.5 |
| 11-Aug-95 | 223 | 14:20 | 0.64 | 22 | 19.5 | 0.12 | 0.64 | 0.01 | 7.4 | 0.04 | 0.01 | 8.31 | 608 | 14.3 | 1.97 | 5.9 |
| 21 -Aug-95 | 233 | 13:35 | 0.65 | 18 | 43.3 | 0.06 | 0.61 | 0.02 | 7.9 | 0.04 | 0.01 | 8.2 | 607 | 11.5 | 1.16 | 4.2 |
| 28-Aug-95 | 240 | 11:40 | 0.6 | 15 | 52.3 | 0.1 | 0.51 | 0.01 | 7.2 | 0.02 | 0.01 | 8.31 | 622 | 12.4 | 1.2 | 3.8 |
| 06-Sept-95 | 249 | 1 2:20 | 0.68 | 18 | 59.6 | 0.07 | 0.7 | 0.01 | 8.2 | 0.06 | 0.01 | 8.31 | 614 | 11 | 1.3 | 3.9 |
| 14-Sept-95 | 257 | 13:05 | 0.65 | 16 | 44.2 | 0.05 | 0.47 | 0.02 | 7.99 | 0.03 | 0.01 | 8.2 | 608 | 11.4 | 1.16 | 4.1 |
| 19-Sept-95 | 262 | 14:40 | 0.65 | 15 | 38.2 | 0.05 | 0.51 | 0.01 | 7.4 | 0.03 | 0.01 | 8.35 | 631 | 11.3 | 1.22 | 3.8 |
| 26-Sept-95 | 269 | 11:50 | 0.66 | 13 | 10.6 | 0.05 | 0.44 | 0.01 | 7.5 | 0.01 | 0.01 | 8.36 | 566 | 11.9 | 1.29 | 4.5 |
| 04-Oct-95 | 277 | 14:35 | 0.68 | 14 | 29.4 | 0.1 | 0.42 | 0.01 | 7 | 0.01 | 0.01 | 8.33 | 636 | 13.2 | 1.43 | 5 |
| 08-Oct-95 | 279 | 11:40 | 0.74 | 14 | 7.5 | 0.05 | 0.9 | 0.01 | 4.43 | 0.04 | 0.01 | 8.18 | 706 | 42 | 4.04 | 20.3 |
| 11 -Oct-95 | 284 | 12:00 | 0.65 | 13 | 29 | 0.05 | 0.43 | 0.01 | 7.6 | 0.03 | 0.01 | 8.31 | 647 | 18 | 1.41 | 5.2 |
| 20-Oct-95 | 293 | 11:10 | 0.65 | 13 | 48 | 0.15 | 0.44 | 0.01 | 7.5 | 0.01 | 0.01 | 8.3 | 647 | 16.8 | 1.6 | 6.9 |
| 24-Oct-95 | 297 | 11:10 | 0.68 | 12 | 24.1 | 0.05 | 0.45 | 0.01 | 6.6 | 0.01 | 0.01 | 8.28 | 860 | 19.1 | 1.84 | 9.1 |
| 31-Oct-95 | 304 | 1 2:00 | 0.7 | 9 | 3.6 | 0.05 | 0.47 | 0.01 | 6.8 | 0.03 | 0.01 | 8.23 | 714 | 35.2 | 1.99 | 15.8 |
| 03-Nov-95 | 307 | 12:18 | 0.7 | 9 | 3.7 | 0.34 | 0.86 | 0.01 | 5.9 | 0.05 | 0.01 | 8.12 | 754 | 62.7 | 3.19 | 31.3 |
| 07-Nov-95 | 311 | 11:05 | 0.725 | 9 | 9 | 0.05 | 0.58 | 0.01 | 5.1 | 0.05 | 0.02 | 8.13 | 757 | 59.1 | 2.69 | 28.6 |
| 13-Nov-95 | 317 | 15:35 | 0.7 | 7 | 3.3 | 0.16 | 0.57 | 0.01 | 7.4 | 0.02 | 0.01 | 8.1 | 647 | 36.8 | 2.31 | 18.1 |
| 21-Nov-95 | 325 | 11:20 | 0.7 | 6 | 9.1 | 0.05 | 0.61 | 0.01 | 7.8 | 0.02 | 0.01 | 8.19 | 696 | 46.7 | 2.34 | 23.6 |
| 28-Nov-95 | 332 | 13:20 | 0.75 | 5 | 14.4 | 0.05 | 0.86 | 0.01 | 8.3 | 0.05 | 0.01 | 8 | 624 | 47.8 | 2.51 | 24 |
| 07-Dec-95 | 341 | 13:25 | 0.63 | 3 | 9.4 | 0.16 | 0.53 | 0.01 | 8.6 | 0.01 | 0.01 | 8.21 | 650 | 24.7 | 1.53 | 10.5 |
| 18-Dec-95 | 352 | 12:10 | 0.72 | 3 | 12.9 | 0.35 | 0.58 | 0.02 | 8.3 | 0.04 | 0.01 | 8.26 | 677 | 32.1 | 1.56 | 14.8 |
| 18-Jan-96 | 18 | 11:50 | 1.18 | 1 | 382 | 0.5 | 5.4 | 0.12 | 2.8 | 1.15 | 0.17 | 7.76 | 506 | 66.1 | 5.21 | 38.7 |
| 23--Jan-96 | 23 | 10:30 | 0.63 | 1 | 5 | 0.09 | 0.62 | 0.01 | 7 | 0.01 | 0.01 | 8.26 | 609 | 23.8 | 1.43 | 11.1 |
| 15-Feb-96 | 46 | 11:55 | 0.65 | 4 | 10.6 | 0.28 | 0.59 | 0.01 | 7.5 | 0.02 | | 8.18 | 618 | 20.7 | 1.49 | 9.3 |
| 03-Apr-96 | 94 | 10:13 | 0.8 | 6 | 2.5 | 0.07 | 0.56 | 0.01 | 5.9 | 0.01 | 0.01 | 8.35 | 582 | 27.4 | 1.77 | 14.4 |
| 10-Apr-96 | 101 | 11:48 | 0.22 | 6 | 5.7 | 0.43 | 0.51 | 0.02 | 6.7 | 0.01 | 0.01 | 8.41 | 634 | 36.8 | 1.53 | 17.4 |
| 15-Apr-96 | 106 | 11:45 | 0.675 | 7 | 4.7 | 0.1 | 0.9 | 0.02 | 5.5 | 0.03 | 0.01 | 8.17 | 553 | 38.7 | 2.07 | 18.8 |

Kintore Creek Routine Grab Samples

C-4

Station 5 (Eastern subwatershed)

Nitrogen

Phosphorus

| Date of Sample | Julian Date | Time | Staff Gauge (m) | Temp (°C) | Suspended Solids (mg/L) | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrite (mg/L) | Nitrate (mg/L) | Total (mg/L) | Dissolved Reactive (mg/L) | pH | Conductivity (µs/cm @ 25 °C) | Chloride (mg/L) | Potassium (mg/L) | Sodium (mg/L) |
|----------------|-------------|-------|-----------------|-----------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------|---------------------------|------|------------------------------|-----------------|------------------|---------------|
| 01-June-95 | 152 | 13:55 | 0.2 | 17 | 5 | 0.05 | 0.76 | 0.02 | 4.2 | 0.04 | 0.01 | 8.22 | 527 | 9 | 1.56 | 3.2 |
| 08-June-95 | 159 | 10:15 | 0.15 | 11 | 1 | 0.27 | 0.4 | 0.02 | 3.5 | 0.02 | 0.02 | 8.33 | 566 | 9 | 1.31 | 3.6 |
| 15-June-95 | 166 | 14:15 | 0.16 | 19 | 17.8 | 0.2 | 0.76 | 0.04 | 3.1 | 0.06 | 0.03 | 8.44 | 543 | 7.5 | 1.35 | 4 |
| 22-June-95 | 173 | 13:07 | 0.16 | 21.5 | 5.2 | 0.06 | 0.51 | 0.04 | 3.3 | 0.03 | 0.01 | 8.37 | 571 | 8.7 | 1.42 | 3.6 |
| 27-June-95 | 178 | 10:05 | 0.18 | 16.5 | 379 | 0.1 | 1.79 | 0.04 | 2.3 | 0.63 | 0.01 | 8-09 | 465 | 7.6 | 2.37 | 2.5 |
| 13--July-95 | 194 | 12:30 | 0.15 | 19.5 | 13.2 | 0.06 | 0.33 | 0.04 | 2.8 | 0.02 | 0.01 | 8.37 | 553 | 8.2 | 1.37 | 4 |
| 20-July-95 | 201 | 14:40 | 0.145 | 18.5 | 11.5 | 0.12 | 0.39 | 0.02 | 2.3 | 0.05 | 0.01 | 8.33 | 556 | 8 | 1.79 | 4.1 |
| 27-July-95 | 208 | 12:45 | 0.1 | 21 | 36.4 | 0.05 | 0.55 | 0.03 | 2.1 | 0.07 | 0.01 | 8.28 | 540 | 7.7 | 1.27 | 3.8 |
| 03-Aug-95 | 215 | 13:30 | 0.13 | 18 | 5 | 0.05 | 0.33 | 0.12 | 2.3 | 0.08 | 0.01 | 8.28 | 561 | 10.4 | 1.83 | 4.5 |
| 11-Aug-95 | 223 | 13:00 | 0.14 | 23 | 10.6 | 0.13 | 0.58 | 0.05 | 2.1 | 0.08 | 0.01 | 8.36 | 567 | 11.7 | 2.48 | 4.4 |
| 21 -Aug-95 | 233 | 11:25 | 0.119 | 18 | 13.1 | 0.07 | 0.58 | 0.02 | 1.9 | 0.05 | 0.01 | 8.24 | 577 | 9.3 | 1.31 | 4.1 |
| 28-Aug-95 | 240 | 10:27 | 0.1 | 18 | 9 | 0.05 | 0.31 | 0.02 | 1.8 | 0.05 | 0.01 | 8.29 | 569 | 9.2 | 1.25 | 3.4 |
| 06--Sept-95 | 249 | 10:35 | 0.108 | 18 | 5 | 0.05 | 0.31 | 0.01 | 1.4 | 0.02 | 0.01 | 8.29 | 556 | 7.2 | 1.38 | 3.6 |
| 14-Sept-95 | 257 | 10:50 | 0.114 | 17 | 5 | 0.05 | 0.32 | 0.02 | 1.57 | 0.04 | 0.03 | 8.25 | 556 | 7.1 | 1.31 | 3.8 |
| 19-Sept-95 | 262 | 13:30 | 0.105 | 15 | 17.1 | 0.05 | 0.32 | 0.02 | 1.5 | 0.04 | 0.01 | 8.28 | 557 | 7.76 | 1.31 | 3.6 |
| 26--Sept-95 | 269 | 10:30 | 0.11 | 12 | 5 | 0.05 | 0.38 | 0.02 | 1.8 | 0.03 | 0.01 | 8.25 | 581 | 11.9 | 1.41 | 6.2 |
| 04-Oct-95 | 277 | 10:35 | 0.13 | 14 | 10.2 | 0.14 | 0.38 | 0.02 | 1.3 | 0.04 | 0.01 | 8.22 | 581 | 9.7 | 2.46 | 4.1 |
| 08-Oct-95 | 279 | 10:40 | 0.245 | 14 | 8.7 | 0.14 | 1.01 | 0.02 | 2.71 | 0.08 | 0.02 | 8.02 | 627 | 24.4 | 4 | 4.8 |
| 11 -Oct-95 | 284 | 10:40 | 0.14 | 12 | 9.3 | 0.15 | 0.43 | 0.01 | 1.6-8 | 0.03 | 0.01 | 8.21 | 6-03 | 9.49 | 1.44 | 3.7 |
| 20-Oct-95 | 293 | 10:15 | 0.15 | 13 | 9.8 | 0.17 | 0.39 | 0-02 | 1.8 | 0.02 | 0.01 | 8.16 | 608 | 11.3 | 1.55 | 5.1 |
| 24-Oct-95 | 297 | 10:05 | 0.17 | 12 | 4.7 | 0.08 | 0.58 | 0.02 | 1.5 | 0.02 | 0.01 | 8.08 | 608 | US | 1.6-8 | 4.9 |
| 31 -Oct-95 | 304 | 10:50 | 0.2 | 9 | 2.7 | 0.08 | 0.6 | 0.01 | 2 | 0.05 | 0.01 | 8.02 | 618 | 14.7 | 1.5 | 4.3 |
| 03-Nov-95 | 3-07 | 11:00 | 0.3-4 | 9 | 8.4 | 0.28 | 0.98 | 0.01 | 0.39 | 0.07 | 0.01 | 7.82 | 555 | 18..8 | 2.42 | 3.7 |
| 07-Nov-95 | 311 | 10:05 | 0.25 | 8.5 | 12.2 | 0.14 | 0.75 | 0.01 | 2 | 0.08 | 0.01 | 8 | 567 | 14.8 | 2.18 | 3.6 |
| 13-Nov-95 | 317 | 11:43 | 0.315 | 6 | 6.4 | 0.13 | 0.77 | 0.02 | 5 | 0.01 | 0.01 | 7.79 | 499 | 14.1 | 2-4 | 3.2 |
| 21 -Nov-95 | 325 | 10:05 | 0.295 | 6 | 9.8 | 0.15 | 0.75 | 0.01 | 5.3 | 0.05 | 0.02 | 8.02 | 539 | 16.2 | 2.16 | 3.7 |
| 28-Nov-95 | 332 | 11:20 | 0.505 | 4 | 16.2 | 0.18 | 0.96 | 0.01 | 6.1 | 0.1 | 0.05 | 7.73 | 449 | 13.5 | 2.14 | 2.8 |
| 07-Dec-95 | 341 | 10:00 | 0.205 | 3 | 13.8 | 0.09 | 0.55 | 0.01 | 4.8 | 0.03 | 0.02 | 8.01 | 559 | 14.4 | 1.58 | 3.8 |
| 18-Dec-95 | 352 | 10:35 | 0.22 | 1 | 3.2 | 0.17 | 0.46 | 0.02 | 2.6 | 0.04 | 0.02 | 8.1 | 542 | 14.1 | 1.4 | 3.8 |
| 18-Jan-96 | 18 | 12:20 | 0.81 | 1 | 185 | 1.46 | 3.09 | 0.72 | 2.1 | 0.7 | 0.31 | 7.55 | 233 | 7.1 | 6.31 | 1.6 |
| 23--Jan-96 | 23 | 11:10 | 0.21 | 1 | 21.5 | 0.09 | 0.66 | 0.01 | 3.6 | 0.01 | 0.02 | 8.17 | 506 | 11.3 | 1.63 | 3.2 |
| Feb-1 5-96 | 48 | 10:40 | 0.195 | 2 | 2.8 | 0.19 | 0.4 | 0.02 | 2.5 | 0.02 | 0.01 | 7.98 | 495 | 9.9 | 1.38 | 3.1 |
| 03--Apr-96 | 94 | 11:00 | 0.205 | 4 | 4.4 | 0.11 | 0.45 | 0.02 | 2.7 | 0.03 | 0.03 | 8.18 | 472 | 9 | 1.83 | 3.5 |
| 10-Apr-96 | 101 | 12:30 | 0.2 | 6 | 1.8 | 0.3-8 | 0.57 | 0.06 | 2.7 | 0.05 | 0.01 | 8.29 | 489 | 12.4 | 1.76 | 4.5 |

Kintore Creek Routine Grab Samples

C-5

Station 6 (Eastern subwatershed)

| Nitrogen | | | | | Phosphorus | |
|----------|--|--|--|--|------------|--|
|----------|--|--|--|--|------------|--|

| Date of Sample | Julian Date | Time | Staff Gauge (m) | Temp (°C) | Suspended Solids (mg/L) | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrite (mg/L) | Nitrate (mg/L) | Total (mg/L) | Dissolved Reactive (mg/L) | pH | Conductivity (µs/cm @ 25 °C) | Chloride (mg/L) | Potassium (mg/L) | Date of Sample |
|----------------|-------------|--------|-----------------|-----------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------|---------------------------|------|------------------------------|-----------------|------------------|----------------|
| 01-June-95 | 152 | 14:15 | 0.25 | 17.5 | 5 | 0.05 | 0.61 | 0.02 | 3.5 | 0.04 | 0.01 | 8.27 | 515 | 9 | 1.11 | 3.3 |
| 08-June-95 | 159 | 10:35 | 0.24 | 12 | 12.4 | 0.27 | 0.5 | 0.02 | 3.6 | 0.03 | 0.02 | 8.35 | 565 | 9.5 | 0.97 | 3.3 |
| 15-June-95 | 166 | 14:25 | 0.249 | 18 | 10.3 | 0.13 | 0.54 | 0.02 | 3.7 | 0.02 | 0.01 | 8.32 | 550 | 8.3 | 1.01 | 3.4 |
| 22-June-95 | 173 | 13:32 | 0.23 | 21 | 22.4 | 0.07 | | 0.03 | 3.6 | | 0.01 | 8.35 | 564 | 8.3 | 1.02 | 3.2 |
| 27-June-95 | 178 | 10:45 | 0.28 | 16.5 | 90.3 | 0.11 | 0.91 | 0.03 | 1.9 | 0.2 | 0.01 | 8.09 | 493 | 9.6 | 2.19 | 2.6 |
| 13-July-95 | 194 | 13:10 | 0.2 | 19 | 3-0.6 | 0.05 | | 0.03 | 3.1 | | 0.01 | 8.23 | 549 | 8 | 1.06 | 3.4 |
| 20-July-95 | 201 | 15:00 | 0.19 | 19 | 21.8 | 0.13 | 0.41 | 0.02 | 2.9 | 0.04 | 0.01 | 8.29 | 560 | 10.5 | 1.65 | 3.7 |
| 27-July-95 | 208 | 13:10 | 0.185 | 19 | 31 | 0.09 | 0.44 | 0.01 | 2.6 | 0.04 | 0.03 | 8.19 | 537 | 8.3 | 1.21 | 3.3 |
| 03-Aug-95 | 215 | 14:00 | 0.185 | 19 | 5 | 0.05 | 0.32 | 0.02 | 2.7 | 0.03 | 0.01 | 8.32 | 552 | 9.1 | 1.86 | 3.7 |
| 11-Aug-95 | 223 | 13:25 | 0.2 | 21 | 5 | 0.05 | 0.45 | 0.02 | 2.3 | 0.02 | 0.01 | 8.45 | 549 | 9 | 2.11 | 3.8 |
| 21-Aug-95 | 233 | 11:45 | 0.19 | 19 | 17.3 | 0.06 | 0.4 | 0.02 | 2.6 | 0.04 | 0.01 | 6.28 | 577 | 8.8 | 1.2 | 3.5 |
| 28-Aug-95 | 240 | 10:43 | 0.18 | 17 | 19.8 | 0.05 | 0.43 | 0.01 | 2.5 | 0.02 | 0.01 | 8.35 | 574 | 9.4 | 1.26 | 3.4 |
| 06-Sept-95 | 249 | 11:10 | 0.188 | 19 | 5 | 0.05 | 0.34 | 0.01 | 2.1 | 0.03 | 0.01 | 8.37 | 560 | 7.9 | 1.18 | 3.21 |
| 14-Sept-95 | 257 | 11:10 | 0.177 | 17 | 31.6 | 0.05 | 0.48 | 0.01 | 2.07 | 0.05 | 0.01 | 8.28 | 58.6 | 8..8 | 1.4 | 3.7 |
| 19-Sept-95 | 28.2 | 13:55 | 0.18 | 15 | 24.3 | 0.05 | 0.31 | 0.02 | 1.9 | 0.06 | 0.01 | 8.43 | 58.0 | 8.02 | 1.23 | 3.4 |
| 26-Sept-95 | 269 | 10:50 | 0.195 | 13 | 38..3 | 0.05 | 0.65 | 0.01 | 2.1 | 0.05 | 0.01 | 8.33 | 572 | 7.82 | 1.34 | 3.6 |
| 04-Oct-95 | 277 | 14:00 | 0.22 | 14 | 22.3 | 0.1 | 0.33 | 0.01 | 1.6 | 0.03 | 0.01 | 8.32 | 578 | 8.32 | 1.95 | 3.5 |
| 06--Oct-95 | 279 | 11:05 | 0.32 | 14 | 5 | 0.11 | 0.86 | 0.01 | 3.65 | 0.05 | 0.01 | 8.08 | 655 | 21.3 | 2.96 | 4 |
| 11 -Oct-95 | 284 | 11:00 | 0.25 | 12 | 37.8 | 0.05 | 0.54 | 0.01 | 2 | 0.02 | 0.01 | 8.24 | 606 | 9.9 | 1.44 | 3.6 |
| 20-Oct-95 | 293 | 10:30 | 0.255 | 14 | 44.7 | 0.2 | 0.55 | 0.01 | 2.1 | 0.03 | 0.01 | 8.21 | 609 | 8.9 | 1.41 | 3.7 |
| 24-Oct-95 | 297 | 10:30 | 0.25 | 13 | 2.9 | 0.05 | 0.46 | 0.01 | 1.7 | 0.01 | 0.01 | 8.12 | 6-09 | 12.1 | 1.51 | 3.9 |
| 31 -Oct-95 | 304 | 11:10 | 0.27 | 9 | 2.4 | 0.06 | 0.46 | 0.01 | 2.2 | 0.04 | 0.02 | 8.08 | 610 | 13.9 | 1.25 | 3.8 |
| 03--Nov-95 | 307 | 11:35 | 0.37 | 9 | 5.5 | 0.47 | 0.92 | 0.01 | 4.3 | 0.05 | 0.01 | 7.89 | 535 | 15.8. | 1.99 | 3.5 |
| 07-Nov-95 | 311 | 10:25 | 0.31 | 8 | 3.9 | 0.12 | 0.55 | 0.01 | 2.1 | 0.04 | 0.01 | 8.01 | 547 | 14.4 | 1.8.3 | 3.3 |
| 13-Nov-95 | 317 | 12:3-0 | 0.35 | 7 | 2.5 | 0.12 | 0.79 | 0.02 | 4.9 | 0.02 | 0.01 | 7.86 | 469 | 11.8 | 1.53 | 3 |
| 21-Nov-95 | 325 | 10:45 | 0.325 | 5.5 | 2.7 | 0.09 | 0.7 | 0.01 | 5.6 | 0.03 | 0.01 | 8.08 | 513 | 13.6 | 1.31 | 3.3 |
| 28-Nov-95 | 332 | 12:18 | 0.45 | 4 | 11.4 | 0.11 | 0.99 | 0.01 | 6.7 | 0.08 | 0.03 | 7.87 | 432 | 11.7 | 1.56 | 2.7 |
| 07-Dec-95 | 341 | 10:30 | 0.26 | 3 | 3.9 | 0.1 | 0.5 | 0.01 | 4.9 | 0.02 | 0.01 | 8.04 | 542 | 12.9 | 1.04 | 3.3 |
| 18-Dec-95 | 352 | 11:15 | 0.27 | 1 | 1.2 | 0.13 | 0.45 | 0.02 | 2.3 | 0.03 | 0.02 | 8.08 | 521 | 12.7 | 0.99 | 3.2 |
| 18-Jan-96 | 18 | 12:30 | 0.55 | 1 | 349 | 1.19 | 4.16 | 0.09 | 2.7 | 0.8 | 0.18 | 7.67 | 268. | 9.9 | 5.48 | 1.8 |
| 23--Jan-96 | 23 | 11:3-0 | 0.25 | 1 | 4.3 | 0.05 | 0.55 | 0.01 | 3.3 | 0.01 | 0.02 | 8.15 | 48.0 | 10.1 | 1.15 | 3 |
| 15-Feb-96 | 46 | 10:57 | 0.248 | 1 | 4.7 | 0.1 | 0.42 | 0.01 | 2.3 | 0.01 | 0.01 | 7.94 | 473 | 9.7 | 1.24 | 3 |
| 03--Apr-96 | 94 | 11:22 | 0.26 | 5 | 2.7 | 0.07 | 0.38. | 0.02 | 2.6 | 0.01 | 0.01 | 8..2 | 442 | 7.8 | 1.19 | 2.9 |
| 10-Apr-96 | 101 | 12:49 | 0.24 | 7 | 2.1 | 0.5 | 0.3-8 | 0.02 | 2.7 | 0.02 | 0.02 | 8.35 | 460 | 10.4 | 1.17 | 3 |

Kintore Creek Routine Grab Samples

C-6

Station 7 (Eastern subwatershed)

| Date of Sample | Julian Date | Time | Staff Gauge (m) | Temp (°C) | Nitrogen | | | | | Phosphorus | | | pH | Conductivity (µs/cm @ 25 °C) | Chloride (mg/L) | Potassium (mg/L) | Sodium |
|----------------|-------------|--------|-----------------|-----------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------|---------------------------|-------|-------|------------------------------|-----------------|------------------|--------|
| | | | | | Suspended Solids (mg/L) | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrite (mg/L) | Nitrate (mg/L) | Total (mg/L) | Dissolved Reactive (mg/L) | | | | | | |
| 01-June-95 | 152 | 14:45 | 0.11 | 15 | 14.8 | 0.15 | 0.5 | 0.04 | 1.6 | 0.06 | 0.01 | 8.12 | 546 | 10.8 | 1.49 | 3.2 | |
| 08-June-95 | 159 | 10:55 | 0.08 | 11 | 5.6 | 0.27 | 0.29 | 0.01 | 1.3 | 0.03 | 0.02 | 8..14 | 571 | 9.8 | 1.29 | 3.1 | |
| 15-June-95 | 166 | 14:45 | 0.12 | 18 | 12.1 | 0.18 | 0.36 | 0.01 | 0.5 | 0.03 | 0.01 | 8.2 | 577 | 6.9 | 1.17 | 3.3 | |
| 22-June-95 | 173 | 13:55 | 0.095 | 15 | 5.9 | 0.05 | 0.28 | 0.01 | 0.3 | 0.01 | 0.01 | 8.21 | 576 | 6.5 | 1.21 | 3 | |
| 27-June-95 | 178 | 11:05 | 0.075 | 16 | 14.7 | 0.08 | 0.61 | 0.02 | 0.3 | 0.1 | 0.01 | 7.91 | 473 | 10.3 | 2.17 | 2.5 | |
| 13-July-95 | 194 | 13:40 | 0.098 | 18.5 | 7.2 | 0.06 | 0.23 | 0.01 | 0.4 | 0.01 | 0.01 | 8.14 | 593 | 8..8 | 1.34 | 3.3 | |
| 20-July-95 | 201 | 15:20 | 0.09 | 15 | 20.2 | 0.12 | 0.35 | 0.01 | 0.3 | 0.06 | 0.01 | 8.18 | 579 | 8.6 | 1.77 | 3.6 | |
| 27-July-95 | 208 | 13:15 | 0.098 | 15 | 82 | 0.09 | 0.96 | 0.01 | 0.6 | 0.28 | 0.02 | 8.16 | 579 | 8..4 | 1.58 | 3.6 | |
| 03-Aug-95 | 215 | 14:10 | 0.09 | 15 | 9.8. | 0.05 | 0.4 | 0.03 | 0.7 | 0.04 | 0.01 | 8.08 | 581 | 7.2 | 1.91 | 3.8. | |
| 11-Aug-95 | 223 | 13:50 | 0.13 | 19 | 24.6 | 0.12 | 0.64 | 0.01 | 0.5 | 0.07 | 0.01 | 8.31 | 58.8. | 12.3 | 2.3 | 3.8 | |
| 21-Aug-95 | 233 | 13:15 | 0.08 | 17 | 12.9 | 0.05 | 0.41 | 0.01 | 0-2 | 0.04 | 0.01 | 6.17 | 58.6 | 7.4 | 1.36 | 3.2 | |
| 28-Aug-95 | 240 | 11:10 | 0.075 | 14 | 12.2 | 0.05 | 0.27 | 0.01 | 0.4 | 0.03 | 0.01 | 8.2 | 591 | 7.3 | 1.45 | 3.1 | |
| 06-Sept-95 | 249 | 11:30 | 0.1 | 16 | 7.3 | 0.08 | 0.2 | 0.01 | 0.4 | 0.03 | 0.02 | 8.24 | 580 | 6.5 | 1.54 | 3.2 | |
| 14-Sept-95 | 257 | 11:30 | 0.1 | 14.5 | 30.9 | 0.05 | 0.3 | 0.01 | 0.37 | 0.05 | 0.01 | 8.21 | 58.0 | 6.9 | 1.4 | 3.4 | |
| 19-Sept-95 | 262 | 14:20 | 0.05 | 13 | 18..9 | 0.05 | 0.18 | 0.01 | 0.3 | 0.05 | 0.01 | 8.17 | 588. | 6.72 | 1.37 | 3.2 | |
| 26--Sept-95 | 269 | 11:19 | 0.075 | 12 | 21.2 | 0.05 | 0.36 | 0.01 | 0.3 | 0.05 | 0.01 | 8.18 | 58.8 | 6.74 | 1.31 | 3.5 | |
| 04-Oct-95 | 277 | 13:47 | 0.075 | 13 | 5 | 0.1 | 0.19 | 0.01 | 0.2 | 0.02 | 0.01 | 8.09 | 598 | 8..92 | 1.42 | 3.4 | |
| 06--Oct-95 | 279 | 11:20 | 0.22 | 13 | 5 | 0.09 | 0.57 | 0.01 | 0.39 | 0.05 | 0.01 | 7.8.5 | 634 | 27.5 | 4 | 4.4 | |
| 11-Oct-95 | 284 | 11:40 | 0.1 | 12 | 7.3 | 0.05 | 0.31 | 0.01 | 0.3 | 0.02 | 0.01 | 8.05 | 624 | 11.6 | 1.61 | 3.7 | |
| 20-Oct-95 | 293 | 10:50 | 0.12 | 12 | 6.2 | 0.18 | 0.21 | 0.01 | 0.4 | 0.02 | 0.01 | 8 | 617 | 12.1 | 1.57 | 3.8 | |
| 24-Oct-95 | 297 | 10:45 | 0.14 | 11 | 4.2 | 0.06 | 0.25 | 0.01 | 0.1 | 0.01 | 0.01 | 7.94 | 629 | 14.2 | 1.88 | 3.9 | |
| 31-Oct-95 | 304 | 11:3-0 | 0.175 | 9 | 1.6 | 0.06 | 0.23 | 0.01 | 0.2 | 0.03 | 0.01 | 7.9 | 635 | 18.8 | 1.81 | 3.8 | |
| 03-Nov-95 | 307 | 11:59 | 0.25 | 9 | 3.4 | 0.18 | 0.45 | 0.01 | 0.3 | 0.05 | 0.01 | 7.85 | 576 | 28.2 | 3.2 | 3.9 | |
| 07-Nov-95 | 311 | 10:45 | 0.25 | 8 | 6.8 | 0.17 | 0.43 | 0.01 | 0.4 | 0.05 | 0.01 | 7.87 | 577 | 21.3 | 2.1 | 3.5 | |
| 13-Nov-95 | 317 | 15:10 | 0.2 | 7 | 2.7 | 0.11 | 0.4 | 0.01 | 1.5 | 0.02 | 0.01 | 7.73 | 505 | 21.3 | 2.6 | 3.1 | |
| 21 -Nov-95 | 325 | 11:00 | 0.25 | 6 | 5.3 | 0.12 | 0.44 | 0.01 | 1.4 | 0.03 | 0.03 | 7.91 | 518 | 20.9 | 2.21 | 3.5 | |
| 28-Nov-95 | 332 | 12:50 | 0.36 | 4 | 10.7 | 0.12 | 0.62 | 0.01 | 1.5 | 0.08. | 0.01 | 7.78 | 438. | 19.9 | 3.13 | 2.7 | |
| 07-Dec-95 | 341 | 11:00 | 0.15 | 3 | 4.9 | 0.1 | 0.3 | 0.01 | 1.6 | 0.02 | 0.01 | 7.94 | 536 | 17.1 | 1.68 | 3.2 | |
| 18-Dec-95 | 352 | 11:40 | 0.22 | 3 | 7 | 0.14 | 0.29 | 0.01 | 1.1 | 0.04 | 0.02 | 8.05 | 534 | 16.5 | 1.65 | 3.3 | |
| 18-Jan-96 | 18 | 13:20 | 1 | 1 | 179 | 2.16 | 5.48 | 0.06 | 1.4 | 0.76 | 0.23 | 7.52 | 292 | 13.5 | 9.64 | 2.7 | |
| 23--Jan-96 | 23 | 11:50 | 0.13 | 1 | 7.7 | 0.09 | 0.43 | 0.01 | 1.3 | 0.01 | 0.01 | 8.12 | 48.4 | 13.3 | 2.07 | 3 | |
| 15-Feb-96 | 46 | 11:23 | 0.075 | 2 | 6.2 | 0.21 | 0.32 | 0.01 | 1.3 | 0.02 | 0.01 | 7.89 | 48.3 | 12.2 | 1.91 | 3 | |
| 03-Apr-96 | 94 | 11:40 | 0.1 | 5 | 4.2 | 0.08. | 0.3 | 0.01 | 1.1 | 0.02 | 0.01 | 7.96 | 466 | 10.4 | 2.43 | 3.1 | |
| 10-Apr-96 | 101 | 13:11 | 0-1 | 7 | 5.9 | 0.36 | 0.29 | 0.02 | 1 | 0.02 | 0.01 | 8.04 | 477 | 11.8 | 1.93 | 2.9 | |
| 15-Apr-96 | 106 | 11:26 | 0.15 | 5 | 7.7 | 1.03 | 0.59 | 0.02 | 1.3 | 0.05 | 0.05 | 7.98 | 427 | 12.2 | 2.77 | 2.8 | |

Kintore Creek Routine Grab Samples

C-7

Station 8 (Eastern subwatershed)

| Date of Sample | Julian Date | Time | Staff Gauge (m) | Temp °C | Suspended Solids (mg/L) | Nitrogen | | | | Phosphorus | | pH | Conductivity (µs/cm @ 25 °C) | Chloride (mg/L) | Potassium (mg/L) | Sodium (mg/L) |
|----------------|-------------|-------|-----------------|---------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------|---------------------------|------|------------------------------|-----------------|------------------|---------------|
| | | | | | | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrite (mg/L) | Nitrate (mg/L) | Total (mg/L) | Dissolved Reactive (mg/L) | | | | | |
| 01-June-95 | 152 | 14:55 | 0.15 | 13 | 33.5 | 0.05 | 0.83 | 0.01 | 5 | 0.06 | 0.01 | 8.17 | 599 | 8.8 | 0.71 | 2.9 |
| 08-June-95 | 159 | 11:05 | 0.16 | 11 | 6.7 | 0.27 | 0.33 | 0.01 | 3.3 | 0.03 | 0.02 | 8.18 | 590 | 8.1 | 0.53 | 2.7 |
| 15-June-95 | 166 | 14:55 | 0.065 | 19 | 16.8 | 0.1 | 0.59 | 0.01 | 3.8 | 0.02 | 0.01 | 8.21 | 601 | 7.3 | 0.52 | 3 |
| 22-June-95 | 173 | 14:15 | 0.09 | 15 | 33.4 | 0.05 | 0.7 | 0.01 | 3.9 | 0.02 | 0.01 | 8.25 | 603 | 7.5 | 0.39 | 2.6 |
| 27-June-95 | 178 | 11:25 | 0.18 | 15 | 11.8 | 0.07 | 0.57 | 0.01 | 1.5 | 0.05 | 0.01 | 8.06 | 549 | 7.6 | 0.83 | 2.7 |
| 13-July-95 | 194 | 13:55 | 0.15 | 15 | 11.1 | 0.05 | 1.37 | 0.01 | 3.6 | 0.07 | 0.01 | 8.3 | 699 | 8.2 | 0.84 | 2.9 |
| 20-July-95 | 201 | 15:40 | 0.13 | 15 | 22.1 | 0.05 | 0.67 | 0.01 | 3 | 0.04 | 0.02 | 8.16 | 600 | 7.8 | 0.86 | 3.1 |
| 27-July-95 | 208 | 13:20 | 0.13 | 15 | 14.5 | 0.05 | 0.39 | 0.01 | 3.4 | 0.04 | 0.01 | 8.23 | 600 | 7.9 | 0.71 | 3.1 |
| 03-Aug-95 | 215 | 14:30 | 0.085 | | 15 | 0.05 | 0.44 | 0.01 | 2.3 | 0.03 | 0.01 | 8.05 | 616 | 10.8 | 1.5 | 3.2 |
| 11 -Aug-95 | 223 | 14:00 | 0.075 | 19 | 11.8 | 0.05 | 0.59 | 0.01 | 2.6 | 0.04 | 0.01 | 8.34 | 6-05 | 9.9 | 1.04 | 3-.2 |
| 21 -Aug-95 | 233 | 13:30 | 0.18 | 17 | 38.9 | 0.05 | 0.49 | 0.01 | 3.4 | 0.03 | 0-01 | 8.22 | 6-09 | 8.7 | 0.54 | 2.9 |
| 28-Aug-95 | 240 | 11:28 | 0.1 | 15 | 6.8 | 0.1 | 0.37 | 0.01 | 2.8 | 0.02 | 0.01 | 8.2 | 617 | 9 | 0.39 | 2.7 |
| 06-Sept-95 | 249 | 11:55 | 0.1 | 17 | 5.4 | 0.07 | 0.35 | 0.01 | 3.1 | 0.03 | 0-01 | 3.21 | 610 | 8.6 | 0.63 | 2.9 |
| 14-Sept-95 | 257 | 12:50 | 0-1 | 15 | 10.5 | 0.05 | 0.33 | 0.01 | 2.92 | 0.02 | 0.01 | 8.21 | 6-10 | 8.6 | 0.56 | 3.1 |
| 19-Sept-95 | 262 | 14:30 | 0.16 | 14 | 5 | 0.05 | 0.3 | 0.01 | 2.9 | 0.04 | 0.01 | 8.12 | 615 | 8.57 | 0.52 | 2.7 |
| 26-Sept-95 | 269 | 11:40 | 0.165 | 13 | 5 | 0.05 | 0.48 | 0.01 | 2.4 | 0.02 | 0.01 | 8.13 | 812 | 7.91 | 0.61 | 2.9 |
| 04-Oct-95 | 277 | 14:15 | 0.18 | 14 | 5 | 0.05 | 0.37 | 0.01 | 2.1 | 0.03 | 0.02 | 8.05 | 612 | 9.02 | 0.82 | 3.1 |
| 06--Oct-95 | 279 | 11:30 | 0.225 | 13 | 5 | 0.05 | 0.57 | 0.01 | 1.81 | 0.03 | 0.01 | 7.88 | 585 | 15.5 | 1.3 | 3.3 |
| 11-Oct-95 | 284 | 11:50 | 0.15 | 13 | 5 | 0.05 | 0.3 | 0.01 | 2.5 | 0.03 | 0.01 | 8.06 | 612 | 8.55 | 0.78 | 2.9 |
| 20-Oct-95 | 293 | 11:04 | 0.2 | 13 | 1.5 | 0.14 | 0.32 | 0.01 | 2.6 | 0.01 | 0.01 | 7.98 | 607 | 9.2 | 0.69 | 3.3 |
| 24-Oct-95 | 297 | 11:05 | 0.2 | 12 | 5.6 | 0.05 | 0.47 | 0.01 | 2.3 | 0.01 | 0.01 | 7.97 | 611 | 9.4 | 0.73 | 3.2 |
| 31 -Oct-95 | 304 | 11:40 | 0.2 | 9 | 2.8 | 0.05 | 0.33 | 0.01 | 2.7 | 0.03 | 0.01 | 7.94 | 608 | 11.5 | 0.71 | 3.1 |
| 03-Nov-95 | 307 | 12:10 | 0.225 | 9 | 5.4 | 0.55 | 0.55 | 0.01 | 3.4 | 0.04 | 0.01 | 7.99 | 581 | 18.6 | 0.97 | 3 |
| 07-Nov-95 | 311 | 11:00 | 0.225 | 8 | 6.7 | 0.11 | 0.5 | 0.01 | 1.7 | 0.04 | 0.04 | 7.94 | 574 | 13.2 | 0.86 | 3 |
| 13-Nov-95 | 317 | 15:25 | 0.24 | 7 | 2 | 0.35 | 0.46 | 0.01 | 6.2 | 0.02 | 0.01 | 7.93 | 569 | 16.5 | 1.03 | 2.9 |
| 21 -Nov-95 | 325 | 11:10 | 0.225 | 6 | | 0.05 | 0.55 | 0.01 | 4.7 | 0.02 | 0.02 | 8.24 | 568 | 15 | 0.77 | 3.1 |
| 28-Nov-95 | 332 | 13:10 | 0.3 | 5 | 8.1 | 0.05 | 0.68 | 0.01 | 8.7 | 0.03 | 0.01 | 7.92 | 526 | 20.3 | 1.22 | 2.7 |
| 07-Dec-95 | 341 | 13:13 | 0.2 | 4 | 5.9 | 0.1 | 0.42 | 0.01 | 5.5 | 0.01 | 0.01 | 8.03 | 593 | 12.2 | 0.66 | 2.9 |
| 18-Dec-95 | 352 | 11:55 | 0.22 | 3 | 4.3 | 0.21 | 0.38 | 0.01 | 4 | 0.04 | 0.01 | 8.13 | 586 | 10.08 | 0.53 | 3 |
| 18-Jan-96 | 18 | 13:30 | 0.7 | 1 | 183 | 1.24 | 2.24 | 0.05 | 2.3 | 0.33 | 0.03 | 7.76 | 234 | 8.2 | 2.07 | 2.4 |
| 23-Jan-96 | 23 | 12:05 | 0.18 | 1 | 16.2 | 0.05 | 0.6 | 0.01 | 5.2 | 0.01 | 0.01 | 8.23 | 584 | 11.6 | 0.75 | 2.9 |
| 15-Feb-96 | 46 | 11:44 | 0.175 | 2 | 16.1 | 0.15 | 0.45 | 0.01 | 4.1 | 0.02 | 0.01 | 8.04 | 570 | 10.2 | 0.75 | 3 |
| 03-Apr-96 | 94 | 11:55 | 0.225 | 5 | 3.9 | 0.07 | 0.39 | 0.01 | 5 | 0.01 | 0.01 | 8.05 | 568 | 10.3 | 0.87 | 3.1 |
| 10-Apr-96 | 101 | 13:20 | 0.2 | 6 | 8.7 | 0.67 | 0.51 | 0.02 | 4.5 | 0.01 | 0.01 | 8.12 | 559 | 10.6 | 0.71 | 2.9 |
| 15-Apr-96 | 106 | 11:35 | 0.35 | 4 | 6.8 | 0.92 | 0.57 | 0.02 | 7.1 | 0.03 | 0.03 | 8.05 | 543 | 14.2 | 0.99 | 2.9 |

Kintore Creek Event Sampling Data
Station I (Western subwatershed)

C-8

| Date | Julian Date | Time | Suspended Solids (mg/L) | Total Phosphorus (mg/L) | TKN (mg/L) |
|------------|-------------|--------|-------------------------|-------------------------|------------|
| 03-Aug-95 | 215 | 05:30 | 5 | 0.18 | 2.07 |
| 03-Aug-95 | 215 | 06:30 | 7.5 | 0.04 | 0.51 |
| 03-Aug-95 | 215 | 07:3-0 | 5 | 0.03 | 0.59 |
| 03-Aug-95 | 215 | 08:3-0 | 5.5 | 0.03 | 0.6-8 |
| 03-Aug-95 | 215 | 09:3-0 | 5 | 0.03 | 0.65 |
| 03-Aug-95 | 215 | 10:30 | 5 | 0.02 | 0.7 |
| 03-Aug-95 | 215 | 11:30 | 5 | 0.02 | 0.7 |
| 04-Aug-95 | 216 | 12:30 | 5 | 0.01 | 0.62 |
| 04-Aug-95 | 218 | 01:30 | 5 | 0.01 | 0.54 |
| 05-Oct-95 | 278 | 18:00 | 5 | 0.06 | 0.73 |
| 05-Oct-95 | 276 | 20:00 | 49.1 | 0.2 | 1.43 |
| 05-Oct-95 | 278 | 22:00 | 111 | 0.3 | 1.54 |
| 05-Oct-95 | 276 | 24:00 | 436 | 5.3 | 27.6 |
| 06-Oct-95 | 279 | 02:00 | 190 | 0.45 | 3.04 |
| 06-Oct-95 | 279 | 04:00 | 102 | 0.33 | 2.49 |
| 06-Oct-95 | 279 | 06:00 | 57.6 | 0.32 | 2.06 |
| 06-Oct-95 | 279 | 06:00 | 30.9 | 0.26 | 2.57 |
| 02-Nov-95 | 3-06 | 20:00 | 124 | 0.37 | 2.35 |
| 02-Nov-95 | 306 | 22:00 | 77.3 | 0.34 | 2.16 |
| 02-Nov-95 | 306 | 24:00 | 34 | 0.24 | 2.11 |
| 10-Nov-95 | 314 | 22:00 | 59.1 | 0.22 | 1.96 |
| 11 -Nov-95 | 315 | 04:00 | 116 | 0.36 | 1.98 |
| 11 -Nov-95 | 315 | 10:00 | 292 | 0.72 | 3.06 |
| 11-Nov-95 | 315 | 12:00 | 148 | 0.52 | 2.21 |
| 11-Nov-95 | 315 | 16:00 | 65.9 | 0.36 | 1.8 |
| 11 -Nov-95 | 315 | 20:00 | 48.9 | 0.28 | 1.82 |
| 11 -Nov-95 | 315 | 24:00 | 39.2 | 0.2 | 1.74 |
| 27-Nov-95 | 331 | 18:00 | 49 | 0.25 | 1.53 |
| 27-Nov-95 | 331 | 20:00 | 126 | 0.35 | 1.83 |
| 27-Nov-95 | 331 | 22:00 | 118 | 0.37 | 1.85 |
| 27-Nov-95 | 331 | 24:00 | 307 | 0.88 | 3.21 |
| 28-Nov-95 | 332 | 02:00 | 74.6 | 0.35 | 1.75 |
| 28-Nov-95 | 332 | 04:00 | 54.7 | 0.33 | 1.63 |
| 25-Mar-96 | 85 | 13:10 | 487 | 1.19 | 5.8 |
| 25-Mar-96 | 85 | 13:50 | 569 | 1.5 | 6.32 |
| 25-Mar-96 | 85 | 11:00 | 93.9 | 0.16 | 1.65 |
| 25-Mar-96 | 85 | 13:00 | 478 | 1.09 | 5.06 |
| 25-Mar-96 | 85 | 15:00 | 667 | 1.64 | 6.72 |
| 25-Mar-96 | 65 | 17:00 | 574 | 1.54 | 6.22 |
| 25-Mar-96 | 65 | 19:00 | 261 | 0.65 | 3.54 |
| 25-Mar-96 | 85 | 21:00 | 165 | 0.61 | 2.7 |
| 12-Apr-96 | 103 | 20:00 | 563 | 1.26 | 6.89 |
| 12-Apr-96 | 103 | 22:00 | 449 | 1.15 | 5.8 |
| 12-Apr-96 | 103 | 24:00 | 196 | 0.68 | 4.21 |
| 13-Apr-96 | 104 | 10:00 | 796 | 1.8 | 7.28 |
| 13-Apr-96 | 104 | 14:00 | 681 | 1.63 | 6.47 |
| 13-Apr-96 | 104 | 18:00 | 270 | 0.96 | 4.16 |

Kintore Creek Event Sampling Data
 Station 5 (Eastern subwatershed)

C-9

| Date | Julian Date | Time | Suspended Solids (mg/L) | Total Phosphorus (mg/L) | TKN (mg/L) |
|-----------|-------------|-------|-------------------------|-------------------------|------------|
| 03-Aug-95 | 215 | 04:30 | 11.9 | 0.03 | 0.42 |
| 03-Aug-95 | 215 | 05:30 | 9.5 | 0.04 | 0.38 |
| 03-Aug-95 | 215 | 08:30 | 11.5 | 0.04 | 0.43 |
| 03-Aug-95 | 215 | 07:30 | 14.2 | 0.04 | 0.5 |
| 03-Aug-95 | 215 | 08:30 | 18.7 | 0.04 | 0.43 |
| 03-Aug-95 | 215 | 09:30 | 9.9 | 0.05 | 0.53 |
| 03-Aug-95 | 215 | 10:30 | 10.4 | 0.04 | 0.44 |
| 03-Aug-95 | 215 | 11:30 | 10.2 | 0.04 | 0.48 |
| 04-Aug-95 | 218 | 12:30 | 5 | 0.03 | 0.38 |
| 04-Aug-95 | 218 | 01:30 | 10 | 0.04 | 0.41 |
| 05-Oct-95 | 278 | 20:00 | 18.1 | 0.12 | 0.52 |
| 05-Oct-95 | 278 | 22:00 | 78.7 | 0.32 | 1.44 |
| 05-Oct-95 | 278 | 24:00 | 239 | 0.59 | 2.33 |
| 06-Oct-95 | 279 | 02:00 | 84.5 | 0.29 | 1.52 |
| 06-Oct-95 | 279 | 04:00 | 38.5 | 0.18 | 1.31 |
| 06-Oct-95 | 279 | 06:00 | 28.7 | 0.13 | 1.2 |
| 06-Oct-95 | 279 | 08:00 | 18.9 | 0.08 | 2.61 |
| 10-Nov-95 | 314 | 22:00 | 165 | 0.24 | 1.38 |
| 11-Nov-95 | 315 | 02:00 | 394 | 0.47 | 1.88 |
| 11-Nov-95 | 315 | 08:00 | 437 | 0.47 | 1.91 |
| 11-Nov-95 | 315 | 14:00 | 275 | 0.38 | 1.82 |
| 11-Nov-95 | 315 | 18:00 | 238 | 0.34 | 1.45 |
| 11-Nov-95 | 315 | 22:00 | 282 | 0.3 | 1.5 |
| 12-Nov-95 | 316 | 02:00 | 272 | 0.25 | 1.38 |
| 27-Nov-95 | 331 | 18:00 | 170 | 0.36 | 1.78 |
| 27-Nov-95 | 331 | 20:00 | 417 | 0.58 | 3.05 |
| 27-Nov-95 | 331 | 22:00 | 238 | 0.46 | 2.03 |
| 27-Nov-95 | 331 | 04:00 | 245 | 0.4 | 1.8 |
| 28-Nov-95 | 332 | 08:00 | 105 | 0.22 | 1.39 |
| 28-Nov-95 | 332 | 08:00 | 360 | 0.32 | 1.74 |
| 25-Mar-96 | 85 | 1430 | 525 | 1.09 | 4.16 |
| 25-Mar-96 | 85 | 11:00 | 168 | 0.28 | 1.74 |
| 25-Mar-98 | 85 | 13:00 | 1580 | 2.35 | 8.79 |
| 25-Mar-96 | 85 | 15:00 | 546 | 1.14 | 4.38 |
| 25-Mar-96 | 85 | 17:00 | 394 | 0.9 | 3.7 |
| 25-Mar-98 | 85 | 19:00 | 213 | 0.48 | 2.2 |
| 25-Mar-98 | 85 | 21:00 | 141 | 0.29 | 1.61 |
| 12-Apr-96 | 103 | 20:00 | 812 | 2.07 | 6.87 |
| 12-Apr-96 | 103 | 22:00 | 417 | 1.1 | 4.21 |
| 12-Apr-96 | 103 | 24:00 | 327 | 0.75 | 3.8 |
| 13-Apr-96 | 104 | 10:00 | 370 | 0.9 | 3.29 |
| 13-Apr-96 | 104 | 14:00 | 109 | 0.37 | 1.9 |
| 13-Apr-96 | 104 | 18:00 | 111 | 0.28 | 1.45 |
| 13-Apr-96 | 104 | 22:00 | 68.8 | 0.22 | 1.48 |
| 14-Apr-96 | 105 | 08:00 | 28.2 | 0.11 | 1.01 |
| 15-Apr-96 | 106 | 16:32 | 65.8 | 0.22 | 1.39 |
| 15-Apr-96 | 106 | 09:50 | 12.6 | 0.08 | 0.77 |
| 15-Apr-96 | 106 | 18:00 | 26.2 | 0.71 | 2.64 |
| 15-Apr-96 | 106 | 20:00 | 90.9 | 0.3 | 1.48 |
| 15-Apr-96 | 106 | 22:00 | 44 | 0.17 | 1.05 |
| 16-Apr-96 | 107 | 02:00 | 73.7 | 0.28 | 1.33 |

Air Temperature and Precipitation Summary

June 1, 1995 to May 31, 1996

| | | Precipitation | | Temperature | | | | | |
|-------|-------|---------------|-------|-------------|-------|-------|-------|------|------|
| | | | | Kettle | | | AES | | |
| Year | Month | Kettle | AES | Min | Mean | Max | Min | Mean | Max |
| 1995 | Jun | 72.1 | 81.9 | 14.28 | 20.4 | 26.55 | 11.6 | 17.7 | 23.8 |
| 1995 | Jul | 33.8 | 76.7 | 15.32 | 20.96 | 26.6 | 14.2 | 20.3 | 26.4 |
| 1995 | Aug | 80.8 | 89.6 | 15.39 | 21.54 | 27.69 | 13.3 | 19.3 | 25.2 |
| 1995 | Sept | 45.4 | 86.2 | 6.39 | 13.69 | 20.99 | 9.6 | 15.3 | 20.9 |
| 1995 | Oct | 115.6 | 76.4 | 4.66 | 10.16 | 15.66 | 3.9 | 9.1 | 14.2 |
| 1995 | Nov | 129.1 | 90.8 | -2.79 | 1.62 | 4.41 | -0.6 | 3.3 | 7.1 |
| 1995 | Dec | 45.4 | 95.3 | -5.55 | -2.09 | 1.37 | -7.1 | -3.4 | 0.1 |
| 1996 | Jan | 80.2 | 69.0 | -11.99 | .203 | -2.22 | -10.7 | -6.7 | -2.8 |
| 1996 | Feb | 52.7 | 60.7 | -10.76 | -6.03 | -1.3 | -10.5 | -6.2 | -2.0 |
| 1996 | Mar | 38.4 | 75.2 | -9.27 | -3.93 | 1.41 | -5.0 | -0.5 | 3.8 |
| 1996 | Apr | 173.03 | 79.2 | -1.02 | 4.52 | 10.06 | 0.7 | 6.2 | 11.7 |
| 1996 | May | 112.6 | 74.2 | 6.17 | 11.72 | 17.26 | 6.4 | 12.6 | 18.7 |
| Total | | 979.13 | 955.2 | | | | | | |

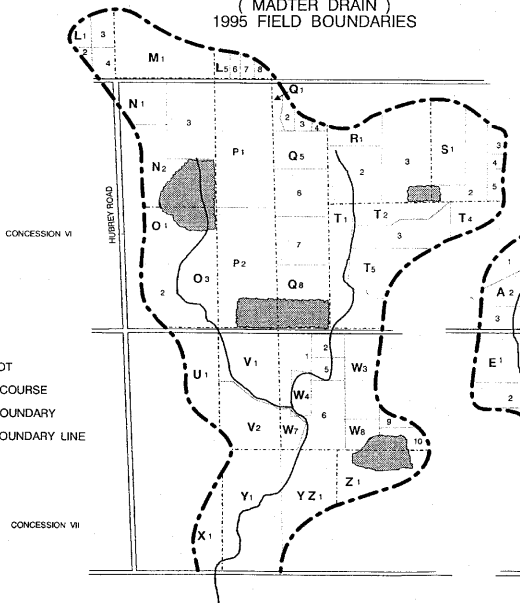
Total Daily Precipitation (mm) (June 1, 1995 to May 31, 1996)

| Day | Jun | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|--------------|-------------|-------------|-------------|-------------|--------------|--------------|-------------|-------------|-----------|-------------|---------------|--------------|--------------|
| 1 | NA | 0.4 | 17.4 | 0 | 0 | 9.5 | 3.5 | 0 | 0 | 0 | 4.5 | 15.1 | 0 |
| 2 | NA | 0 | 0 | 0 | 0 | 17.9 | 0 | 0 | 0 | 2 | 0 | 0.8 | 0 |
| 3 | NA | 0 | 14.2 | 6.8 | 10.4 | 0.1 | 4 | 3 | 0 | 0 | 0 | 0 | 0 |
| 4 | NA | 0 | 0.1 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 1.5 | 2.6 | 8 |
| 5 | NA | 0 | 6.3 | 0 | 58.7 | 0 | 0 | 0 | 0 | 0 | 1.0 | 0.1 | 0 |
| 6 | 11.3 | 0 | 0 | 0 | 5.8 | 0 | 0 | 0 | 0 | 3.5 | 0 | 0 | 0 |
| 7 | 0 | 2.4 | 0 | 8.8 | 0.1 | 8.4 | 8 | 0 | 1.0 | 2.0 | 3.5 | 0 | 0.4 |
| 8 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 3.5 | 12 | 0 | 0 | 0 | 5.1 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.6 | 20.6 |
| 10 | 0 | 0 | 0 | 0 | 0 | 11.5 | 0 | 0 | 1 | 0 | 0 | 26.4 | 0.1 |
| 11 | 0 | 0 | 0 | 0 | 0 | 51.7 | 0 | 0 | 0.5 | 6 | 2.5 | 13.2 | 0 |
| 12 | 0 | 0 | 4.6 | 0 | 0 | 0 | 19.6 | 0 | 0 | 10 | 1.0 | 4.8 | 0 |
| 13 | 0 | 7 | 5.6 | 7.9 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 0 | 7.1 |
| 14 | 0 | 0 | 32.2 | 0 | 15.8 | 1.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0.4 | 0 | 0 | 0.1 | 1 | 0 | 8 | 0 | 27.43 | 0 | 1.9 |
| 16 | 0 | 0.6 | 0 | 0 | 0 | 0.4 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 0 | 7.1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 0 | 0 | 0 | 8.3 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 19 | 0 | 0.1 | 0 | 0 | 0 | 0 | 1 | 1 | 0.5 | 0 | 0 | 0 | 5.3 |
| 20 | 0 | 4.9 | 0 | 8.6 | 8.2 | 0.1 | 0 | 0 | 1.5 | 0 | 21.5 | 0 | 19.6 |
| 21 | 0 | 7.4 | 0 | 0.6 | 1.3 | 0.1 | 0 | 0 | 1 | 4 | 22.4 | 23.5 | 8.8 |
| 22 | 0 | 0 | 0 | 5.1 | 0.1 | 0 | 0 | 0 | 0 | 22 | 0 | 16.5 | 0.2 |
| 23 | 0 | 6.7 | 0 | 0 | 0 | 0 | 1 | 0 | 0.5 | 1 | 8.2 | 0.9 | 0.1 |
| 24 | 6.7 | 0.6 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2.5 | 4.9 | 5.1 | 14.5 |
| 25 | 1.6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | 0 | 1.5 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 9.4 |
| 27 | 11.6 | 2.1 | 0 | 0 | 10.6 | 0.3 | 2 | 13 | 3 | 0 | 0 | 0 | 0 |
| 28 | 6 | 0.1 | 0 | 0 | 1.4 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 29 | 1.6 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 9.6 | 0 | 0 |
| 30 | 33.3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | 1 | 0 | 0 | 0 |
| 31 | | 0 | 0 | | 2.1 | | 0 | 0 | | 4.5 | | 0 | 0 |
| Total | 72.1 | 33.8 | 80.8 | 45.4 | 115.6 | 129.1 | 41.1 | 26.5 | 33 | 58.5 | 173.03 | 112.6 | 101.1 |

| Day | December | | | January | | | February | | | March | | | April | | | May | | |
|-----|----------|---------|--------|---------|--------|--------|----------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|
| | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min |
| 1 | 3.868 | 6.316 | -0-11 | -1.204 | 0.327 | -5.195 | -14.94 | -11.17 | -21.97 | -6.334 | -3-251 | -11.89 | 1.383 | 6.145 | -2.473 | 7.22 | 12.29 | 0.628 |
| 2 | -0.183 | 1.538 | -1.358 | -8.81 | -5.143 | -12.13 | -17.86 | -13.22 | -22.18 | -2.282 | 0.84 | -7.17 | -0.09 | 5.235 | -4.328 | 7.97 | 15.63 | -2.468 |
| 3 | 3.62 | 8.29 | 0.856 | -13.48 | -10.43 | -18.23 | -20.46 | -16.42 | -24.68 | -10 | -6.927 | -14.06 | 1.29 | 5.198 | -0.682 | 8.24 | 14.48 | 0.605 |
| 4 | 0.114 | 3.104 | 4.183 | -19.05 | -13.2 | -27.73 | -19.68 | -14.81 | -24.44 | -6.444 | -2.256 | -10.61 | -1.674 | -0.357 | -3.138 | 9.33 | 13.17 | 5.885 |
| 5 | 1-23 | 5.73 | -2.547 | -15.13 | -10.16 | -24-13 | -14.57 | -10.27 | -18.13 | -2.949 | -0.621 | 4.958 | -1.358 | 2.651 | -3.848 | 8.34 | 13.32 | 2.787 |
| 6 | -3.538 | -1.137 | -5.673 | -17.07 | -9.52 | -26-56 | -13.48 | -8.03 | -20.95 | -6.59 | -2.214 | -11.46 | -1.606 | 1.766 | -5.345 | 9.02 | 15.26 | 1.836 |
| 7 | -7.07 | -5.262 | -9.19 | -12.61 | -9.51 | -15.46 | -1-366 | 1-813 | -10.38 | -13.76 | -11.41 | -17.45 | -2.435 | 0.941 | 4.632 | 9.17 | 14.65 | 1.417 |
| 8 | -5.688 | -1.1979 | -10.32 | -10.69 | -6.328 | -16.39 | 2.346 | 4.558 | 0.025 | -14.56 | -10.95 | -19-23 | -2.524 | 3.039 | -7.28 | 11.25 | 17.74 | 4.676 |
| 9 | -9.69 | -0.851 | -17.28 | -7.05 | -3.963 | -9.45 | 0.351 | 1.674 | -2.106 | -14.37 | -7.97 | -21-25 | -1.478 | 3.037 | -8.09 | 13.37 | 17.67 | 9.15 |
| 10 | -13.6 | -11.03 | -16.72 | -13.41 | -5.494 | -24.51 | 3.075 | 7.68 | -0.32 | -12.78 | -3.397 | -24.28 | 2.4 | 8.06 | -3.63 | 14.18 | 22.36 | 5.769 |
| 11 | -14.26 | -12.19 | .16.09 | -13.66 | -8.07 | -22.94 | -1.894 | 5.869 | -8.86 | -7.21 | 1.921 | -18.41 | 9.98 | 19.01 | -3.379 | 5.026 | 7.54 | 1.97 |
| 12 | -12.15 | -7.69 | -18.1 | -9.0 | -3.157 | -16.89 | -11.41 | -8.84 | -14-38 | -3.93 | 6.715 | -14.11 | 8.99 | 14.75 | 4.443 | 3.793 | 7.09 | 0.203 |
| 13 | -9.89 | 4.333 | -18.92 | -3.282 | -0.791 | -9.4 | -10.75 | -5.577 | -20.21 | 0.5 | 8.123 | -7.69 | 2.852 | 5.965 | -0.204 | 4.93 | 10.31 | -0.522 |
| 14 | 0.717 | 5.497 | -6.481 | -0.522 | 2.595 | 4.649 | -5.696 | -2.823 | -10.99 | 4.003 | 10.8 | -3.688 | 2.728 | 8.84 | -0.428 | 7.76 | 14.31 | -2.242 |
| 15 | 0.76 | 1.33 | 0-172 | -11.28 | 4.64 | -14.2 | -10.1 | 4-975 | -17.02 | -0.067 | 3.424 | 4.237 | 6.19 | 10.61 | 1.325 | 10.25 | 15.37 | 3.852 |
| 16 | -2.099 | 0.364 | -3.335 | -3.892 | 5.599 | -13.05 | -14.5 | -6.492 | -23.02 | -2.329 | 2-957 | -6.552 | 2.179 | 5.321 | 0.367 | 11.17 | 13.92 | 8.4 |
| 17 | 4-987 | -1.85 | -9.67 | 4.925 | 6.634 | 3.397 | -10.37 | 4.594 | -22.47 | 0.868 | 7.5 | -3.232 | 3.295 | 8.89 | -1.505 | 16.17 | 22.34 | 11.32 |
| 18 | 4.232 | -1.702 | -6.219 | 10.13 | 12.89 | 6-347 | -13.07 | -10.24 | -19.33 | 1.605 | 8.05 | -2.701 | 9.23 | 19.65 | -2.878 | 22.44 | 28.65 | 15.72 |
| 19 | -8.31 | -5.368 | -11.36 | -4.537 | 9.0 | -10.19 | 4.503 | 2.434 | -14.73 | 4.921 | 10.16 | 0.282 | 15.27 | 21.36 | 8.15 | 23.33 | 28.69 | 16.61 |
| 20 | -9.53 | -6.554 | -13.07 | -9.28 | -6.181 | -11.45 | 3.28 | 4.648 | 1.681 | -0.23 | 0.593 | -2.438 | 14.8 | 19.26 | 10.98 | 22.42 | 28.38 | 17.13 |
| 21 | -7.26 | 4.753 | -11.51 | -5.771 | -3.114 | -8.11 | 3.501 | 5.887 | 1.702 | -5.631 | -2.386 | -6.946 | 10.03 | 14.99 | 2.68 | 17.26 | 21.03 | 13.44 |
| 22 | 4.988 | -2.748 | -8.03 | -0.276 | 4.193 | -5.416 | 2.314 | 4.285 | 1.04 | 4.218 | -2.246 | -6.97 | 9.35 | 15.57 | 2.287 | 15.44 | 21.91 | 10.51 |
| 23 | -3.739 | -2.593 | 4.867 | -0.624 | 1.58 | -0.033 | 2.926 | 8.15 | 0.065 | -3.167 | 1.314 | -7.06 | 3.25 | 9.61 | 0.704 | 15.15 | 21.35 | 10.94 |
| 24 | 4.137 | -2.959 | -5.175 | -1.887 | 3.663 | -7.51 | 5.18 | 9.24 | 2.206 | 0.052 | 7.65 | -8.98 | 5.269 | 13.53 | -1.672 | 12.64 | 17.16 | 7.83 |
| 25 | -5.201 | -2.321 | -8.14 | -7.01 | 4.261 | -10.2 | 4-304 | 9.97 | -1.326 | 6.233 | 12.15 | -3.336 | 10.54 | 16.57 | 2-499 | 12.3 | 8.56 | 4.524 |
| 26 | -11.06 | -6-495 | -19.58 | -0.461 | 3.956 | 4.725 | 2.198 | 7.71 | -1.433 | -6.382 | -2.969 | -11.69 | 7.52 | 14.95 | -0-373 | 13-02 | 17.58 | 9.85 |
| 27 | -8.4 | -4.859 | -19-9 | -2.37 | 6.642 | -6.313 | 1.303 | 2-961 | 0.038 | -6.789 | -1.774 | -13.69 | 2.52 | 9.28 | -2.411 | 13.46 | 18.36 | 6.757 |
| 28 | -5.666 | -2.762 | -12.41 | -7-26 | 4-071 | -12.15 | -2.942 | 3.921 | -8.86 | -0.631 | 4-983 | -5.397 | 6.107 | 13.15 | -3.781 | 14.01 | 20.96 | 7.04 |
| 29 | -6.029 | -1.438 | -9.23 | -4.261 | 2-295 | -8.36 | -9.35 | -6.298 | -14.65 | 3.031 | 9.97 | -1-304 | 7-03 | 10-13 | 4.943 | 11.82 | 16.9 | 7.79 |
| 30 | -5-149 | -0.646 | -8.88 | -11.12 | -8.33 | -13.39 | | | | 3.78 | 11.26 | -2.068 | 6.388 | 8-93 | 4.266 | 12.5 | 19.77 | 5.468 |
| 31 | -0.98 | 1.373 | -5.553 | -15.8 | -11.84 | -22.55 | | | | 5.997 | 14.6 | -0.025 | | | | 12.8 | 21.57 | 2.111 |

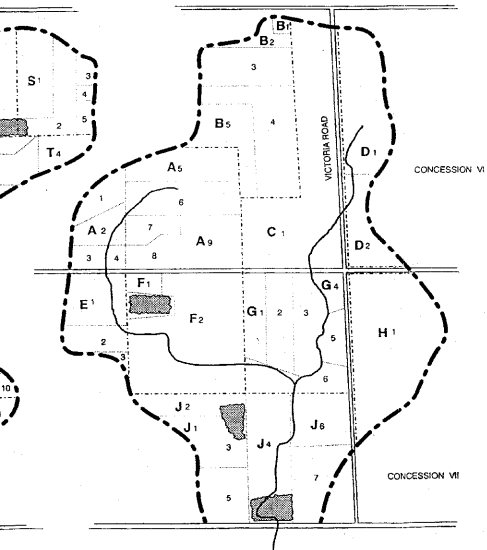
KETTLE CREEK PAIRED WATERSHEDS

WEST PAIRED WATERSHED (MADTER DRAIN) 1995 FIELD BOUNDARIES



KETTLE CREEK PAIRED WATERSHEDS

EAST PAIRED WATERSHED
(HOLTBY DRAIN)
1995 FIELD BOUNDARIES



SCALE 1: 15,500

KETTLE
1995 Field Activities
Western Sub-Basin (Madter Drain)

E-2

| Land Owner | Field # | Size (Acres) | Fall 1994 Tillage | Spring 1995 Tillage | Crop |
|-------------------|----------------|---------------------|-----------------------------|----------------------------|--------------|
| L | 1 | 3.7 | No-till | No-till | Corn |
| | 2 | 8.52 | Nothing | Nothing | Pasture |
| | 3 | 10.25 | Nothing | Nothing | Hay |
| | 4 | 6.26 | No-till | No-till | Corn |
| | 5 | 6.26 | Soil saved | Nothing | Hay |
| M | 1 | 30.75 | No-till | No-till | Soybean |
| | 2 | 7.17 | Nothing | Nothing | Pasture |
| N | 1 | 16.37 | Plough | 2 pass cultivate | Corn |
| | 2 | 30.6 | Plough | 2 pass cultivate | Corn |
| | 3 | 30.92 | Plough -2 | pass cultivate | Soybean |
| O | 1 | 15.09 | Plough | 2 pass cultivate | Soybean |
| | 2 | 23.7 | Seed into hay | Nothing | Hay |
| | 3 | 30.75 | 2 pass cultivate into wheat | Nothing | Winter Wheat |
| P | 1 | 45.91 | No-till | Disc | Soybean |
| | 2 | 38.86 | No-till | No-till | Soybean |
| Q | 1 | 35.65 | Plough | 2 pass cultivate | Soybean |
| | 2 | 22.96 | No-till into wheat | Nothing | Winter Wheat |
| | 3 | 26.34 | Plough | 2 pass cultivate | Corn |

| | | | | | |
|----|---|-------|--------------------|------------------|--------------|
| R | 1 | 10.11 | Plough | 2 pass cultivate | Soybeans |
| | 2 | 23.49 | Plough | 2 pass cultivate | Soybeans |
| | 3 | 37.44 | Nothing | Nothing | Hay |
| S | 1 | 26.34 | No-till | No-till | Corn |
| | 2 | 18.36 | No-till | No-till | Soybeans |
| | 3 | 6.98 | Plough | 2 pass cultivate | Soybeans |
| | 4 | 1.85 | No-till | No-till | Corn |
| T | 1 | 25.48 | No-till | No-till | Soybeans |
| | 2 | 18.79 | No-till into wheat | Nothing | Winter Wheat |
| | 3 | 12.24 | No-till into wheat | Nothing | Winter Wheat |
| | 4 | 14.24 | No-till | No-till | Soybeans |
| | 5 | 11.39 | No-till | No-till | Corn |
| | 6 | 2.14 | No-till | No-till | Corn |
| | 7 | 12.1 | No-till | No-till | Soybeans |
| U | 1 | 23.45 | No-till into wheat | Nothing | Winter Wheat |
| V | 1 | 22.78 | No-till into wheat | Nothing | Winter Wheat |
| | 2 | 53.12 | Nothing | Nothing | Hay |
| W | 1 | 28.32 | No-till | No-till | Corn |
| | 2 | 24.77 | No-till | No-till | Soybeans |
| | 3 | 18.93 | Soil saved | 2 pass cultivate | Corn |
| | 4 | 19.65 | No-till | No-till | Soybeans |
| | 5 | 21.43 | No-till | No-till | Soybeans |
| | 6 | 20.78 | Soil saved | 2 pass cultivate | Corn |
| X | 1 | 13.24 | Plough | 2 pass cultivate | Corn |
| Y | 1 | 49.74 | No-till | I pass cultivate | Corn |
| YZ | 1 | 22.63 | Chisel plough | I pass cultivate | Corn |
| Z | 1 | 21.92 | Soil saved | 2 pass cultivate | Soybeans |

KETTLE
1995 Field Activities
Eastern Sub-Basin (Holtby Drain)

E-4

| Land Owner | Field # | Size (Acres) | Fall 1994 Tillage | Spring 1995 Tillage | Crop |
|------------|---------|--------------|-----------------------------|---------------------|--------------|
| A | 1 | 16.91 | No-till into wheat | Nothing | Winter Wheat |
| | 2 | 1.30 | No-till | No-till | Soybeans |
| | 3 | 11.81 | No-till | No-till | Corn |
| | 4 | 9.11 | No-till | No-till | Soybeans |
| | 5 | 3.35 | No-till | No-till | Corn |
| | 6 | 4.30 | No-till | No-till | Corn |
| | 7 | 28.93 | Plough | 2 pass cultivate | Corn |
| | 8 | 42.67 | No-till | No-till | Soybeans |
| B | 1 | 6.55 | No-till | No-till | Soybeans |
| | 2 | 19.85 | No-till | No-till | Corn |
| | 3 | 39.92 | Plough | 2 pass cultivate | Soybeans |
| | 4 | 12.67 | Plough | 2 pass cultivate | Corn |
| | 5 | 22.01 | 1 pass cultivate into wheat | Nothing | Winter Wheat |
| C | 1 | 25 | Plough | 2 pass cultivate | Corn |
| | 2 | 35.7 | 1 pass cultivate | Nothing | Winter Wheat |
| | 3 | 68 | Plough | 2 pass cultivate | Corn |
| D | 1 | 46.92 | No-till | 2 pass cultivate | Soybeans |
| | 2 | 44.85 | Plough | 3 pass cultivate | Soybeans |
| E | 1 | 21.06 | No-till | No-till | Soybeans |
| | 2 | | No-till | Soil saved, 2 | Corn |
| | 3 | 1.81 | Soil saved | pass cultivate | Corn |
| F | 1 | 83.8 | No-till | No-till | Soybeans |

| | | | | | |
|---|---|-------|---------------|------------------|----------------------|
| G | 1 | 9.48 | Plough | 2 pass cultivate | Corn |
| | 2 | 17.07 | Nothing | 2 pass cultivate | Corn |
| | 3 | 30.61 | Plough | 2 pass cultivate | Soybeans |
| | 4 | 8.54 | Nothing | 1 pass disc | Corn |
| | 5 | 11.1 | No-till | No-till | Soybeans |
| | 6 | 11.39 | No-till | No-till | |
| | 7 | 10.46 | No-till | No-till | Soybeans Soybeans |
| H | 1 | 84.28 | Chisel plough | 2 pass cultivate | Corn |
| J | 1 | 9.33 | Plough | 2 pass cultivate | Corn |
| | 2 | 2.75 | Nothing | Nothing | Hay |
| | 3 | 17.24 | Nothing | Nothing | Pasture |
| | 4 | 9.3 | Plough | Conventional | Corn |
| | 5 | 32.1 | Nothing | Nothing | Pasture |
| | 6 | 39.46 | Nothing | Nothing | Hay |

Kettle Creek - Water Quality
 Routine Samples Madter Drain (western subwatershed)

F-1

| Date | Julian Date | Time | Staff Gauge (m) | Temperature (C) | Suspended Solids (mg/L) | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrate (mg/L) | Nitrite (mg/L) | Total Phosphorous (mg/L) | Dissolved Reactive (mg/L) | pH | Conductivity (µmho/ml) | Chloride (mg/L) | Potassium (mg/L) | Sodium (mg/L) |
|-----------|-------------|-------|-----------------|-----------------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------------------|---------------------------|------|------------------------|-----------------|------------------|---------------|
| May-15-95 | 135 | 15:15 | 0.0046 | NA | L5 | 0.08 | 0.69 | 7.5 | 0.05 | 0.03 | L0.01 | 8.53 | 5.6 | 31.8 | 2.45 | 11.0 |
| Jun-06-95 | 157 | 14:00 | 0.0018 | NA | L5 | 0.35 | 0.72 | 10.3 | 0.04 | 0.06 | L0.01 | 8.37 | 625 | 33.8 | 2.51 | 12.3 |
| Nov-07-95 | 311 | 08:30 | 0.0032 | 5.622 | 13.5 | 0.14 | 0.83 | 12.6 | 0.03 | 0.19 | 0.07 | 7.93 | 680 | 47.1 | 5.24 | 16.7 |
| Nov-17-95 | 321 | 09:30 | 0.0048 | 4.5 | 4.2 | L0.05 | 0.57 | 14.4 | 0.01 | 0.09 | 0.02 | 7.97 | 675 | 52 | 2.99 | 18.0 |
| Dec-01-95 | 335 | 12:30 | 0.01 | 4.154 | 18.3 | 0.42 | 1.05 | 10 | 0.03 | 0.14 | 0-06 | 7.92 | 562 | 37.4 | 3.59 | 11.9 |
| Dec-15-95 | 349 | 10:00 | 0.017 | 0.17 | 9.8 | 0.18 | 1.2 | 6.4 | 0.03 | 0.25 | 0.09 | 7.92 | 463 | NA | 4.92 | 20-7 |
| Jan-02-96 | 2 | 10:00 | N/A | 0.65 | 4.5 | 0.51 | 0.6 | 5.5 | 0.02 | 0.05 | LO.01 | 8.17 | 865 | 82.1 | 2.91 | 28.8 |
| Jan-12-96 | 12 | 14:00 | N/A | 0.167 | 2.8 | LO.05 | 0.67 | 6.4 | 0.05 | 0.07 | LO.01 | 8.12 | 673 | 34.6 | 2.57 | 14.3 |
| Jan-26-96 | 26 | 10:00 | 0.0003 | 0.609 | 14.4 | LO.05 | 0.62 | 9.5 | 0.02 | 0.05 | 0.05 | 8.0 | 582 | 29.6 | 3.85 | 7.3 |
| Feb-12-96 | 43 | 10:00 | 0.0032 | 0.146 | 11.3 | 0.24 | 0.86 | LO.1 | 0.03 | 0.11 | 0.02 | 7.91 | 589 | 44.2 | 3.06 | 18.1 |
| Apr-09-96 | 100 | 11:00 | N/A | 2.629 | 10.4 | 1.62 | 2.32 | 9.4 | 0.14 | 0.15 | 0.14 | 8.09 | 649 | 38.6 | 4.12 | 13.7 |

ISCO Samples

| Date | Julian Date | Time | staff Gauge (m) | Temperature (C) | Suspended Solids (mg/L) | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrate (mg/L) | Nitrite (mg/L) | Total Phosphorous (mg/L) | Dissolved Reactive (mg/L) | pH | Conductivity (µmho/ml) | Chloride (mg/L) | Potassium (mg/L) | Sodium (mg/L) |
|-----------|-------------|-------|-----------------|-----------------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------------------|---------------------------|------|------------------------|-----------------|------------------|---------------|
| Nov-27-95 | 331 | 13:00 | 0.009 | 4.464 | 14.2 | 0.48 | 1.48 | 9.7 | 0.02 | 0.11 | LO.01 | 8.13 | 607 | 46.3 | 6.32 | 8.5 |
| Nov-27-95 | 331 | 19:00 | 0.016 | 4.464 | 23.2 | 0.93 | 2.44 | 8-5 | 0.02 | 0.17 | LO.01 | 8.01 | 605 | 45.7 | 7.97 | 7.9 |
| Nov-27-95 | 331 | 22:00 | 0.075 | 4.464 | 469 | 0.28 | 3.7 | 3.6 | 0.03 | 1.1 | L0.01 | 7.61 | 327 | 21.1 | 7.29 | 4.0 |
| Nov-28-95 | 332 | 05:00 | 0.028 | 4.341 | 153 | L0.05 | 1.94 | 4.0 | 0.03 | 0-59 | LO.01 | 7.58 | 291 | 18.8 | 6.01 | 3.9 |
| Nov-28-95 | 332 | 20:00 | 0.008 | 4.341 | 125 | 0.10 | 1.52 | 8.7 | 0.03 | 0.39 | LO.01 | 7.82 | 447 | 31.7 | 4.99 | 6.4 |
| Nov-29-95 | 333 | 10:00 | 0.005 | 3.848 | 22.6 | 0.13 | 1.32 | 9.4 | 0.02 | 0.2 | LO.01 | 7.87 | 486 | 31.1 | 4.55 | 6.3 |
| Mar-24-96 | 84 | 01:30 | 0.0038 | 0.749 | 26 | 0.53 | 0.91 | 5.8 | 0.03 | 0.09 | 0.03 | 7.98 | 505 | 41.8 | 2.83 | 16.1 |
| Mar-24-96 | 84 | 07:30 | 0.0048 | 0.749 | 254 | 0.50 | 1.89 | 4.9 | 0.04 | 0.5 | 0.02 | 7.73 | 382 | 30.1 | 3.03 | 12.1 |
| Mar-24-96 | 84 | 13:30 | 0.017 | 0.749 | 845 | 0.38 | 4.69 | 4.2 | 0.03 | 1.73 | 0.03 | 7.77 | 246 | 12.9 | 4.17 | 5.9 |
| Mar-24-96 | 84 | 19:30 | 0.02 | 0.749 | 519 | 0.18 | 3.81 | 5.1 | 0.04 | 1.28 | 0.04 | 7.70 | 314 | 17.2 | 5-06 | 8.1 |
| Mar-25-96 | 85 | 01:30 | 0.037 | 1.963 | 180 | 0.08 | 1.63 | 6.6 | 0.04 | 1.41 | 0.02 | 7.81 | 418 | 23.6 | 3-81 | 10.6 |
| Mar-25-96 | 85 | 07:30 | 0.005 | 1.963 | 53 | 0.36 | 1.09 | 7.4 | 0.04 | 0-18 | 0.01 | 7.93 | 489 | 26.8 | 3.33 | 11.3 |
| Apr-15-96 | 106 | 06:00 | 0.0049 | 4.539 | 5.5 | 0.42 | 0.65 | 10.2 | 0.07 | 0.05 | 0.01 | 8.21 | 609 | 34.1 | 2.86 | 12.5 |
| Apr-15-96 | 106 | 12:00 | 0.032 | 4.539 | 60.3 | 0.26 | 1.14 | 8.9 | 0.04 | 0.22 | 0.02 | 7.89 | 446 | 25-3 | 2.86 | 9.1 |
| Apr-16-96 | 107 | 09:00 | 0.013 | 4.253 | 59 | 0.22 | 0.85 | 10.2 | 0.03 | 0.14 | 0.02 | 8.04 | 527 | 27.6 | 3.19 | 10.3 |
| Apr-17-96 | 108 | 03:00 | 0.006 | 5.022 | 9.1 | 0-3 | 0.87 | 9.8 | 0.05 | 0.05 | 0.02 | 8.02 | 553 | 28.1 | 2.98 | 10.6 |

Kettle Creek Water Quality Routine Samples Holtby Drain (eastern subwatershed)

| Date | Julian Date | Time | Staff Gauge (m) | Temperature (C) | Suspended Solids (mg/L) | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrate (mg/L) | Nitrite (mg/L) | Total Phosphorous (mg/L) | Dissolved Reactive (mg/L) | pH | Conductivity (µmho/ml) | Chloride (mg/L) | Potassium (mg/L) | Sodium (mg/L) |
|-----------|-------------|-------|-----------------|-----------------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------------------|---------------------------|------|------------------------|-----------------|------------------|---------------|
| May-15-95 | 136 | 15:00 | 0.002 | NA | L5 | 0.09 | 0.73 | 2.9 | 0.04 | 0.03 | LO.01 | 8.42 | 553 | 32.1 | 3.21 | 7.9 |
| Jun-05-95 | 156 | 14:00 | 0.0011 | NA | L5 | 0.17 | 0.88 | 1.7 | 0.05 | 0.06 | 0.02 | 8.25 | 581 | 35.8 | 2.74 | 7.9 |
| Nov-07-95 | 311 | 08:30 | 0.0039 | 5.622 | 3.5 | 0.16 | 1.03 | 8.7 | 0.04 | 0.13 | 0.06 | 7.67 | 769 | 87.5 | 11.6 | 15.1 |
| Nov-17-95 | 321 | 09:00 | 0.015 | 4-5 | 3.1 | 0.24 | 1.16 | 11-4 | 0-01 | 0.1 | LO.01 | 7.8 | 630 | 48-1 | 5.56 | 8.2 |
| Dec-01-95 | 335 | 12:30 | 0.016 | 4-154 | 6.2 | 0-88 | 1.3 | 7-5 | 0-02 | 0.11 | 0-02 | 7.63 | 556 | 41.4 | 4-23 | 7-4 |
| Dec-15-95 | 349 | 10:00 | 0.023 | 0.17 | 9-3 | 2.45 | 3.11 | 4-3 | 0.04 | 0.5 | 0.37 | 7-82 | 420 | NA | 7-74 | 6.8 |
| Jan-02-96 | 2 | 10:00 | N/A | 0.65 | 98.8 | 0-62 | 1.48 | 0.7 | 0.06 | 0.26 | LO.01 | 7.95 | 846 | 86.7 | 5-19 | 16.2 |
| Jan-12-96 | 12 | 14:15 | N/A | 0.167 | 19.5 | 0-16 | 1 | 3.3 | 0.03 | 0.12 | 0.04 | 7-88 | 664 | 42 | 4-57 | 9.2 |
| Jan-26-96 | 26 | 21:00 | 0.0044 | 0-609 | 10.6 | LO.05 | 0.65 | 7.4 | 0.02 | 0.08 | 0.07 | 7.75 | 552 | 31-4 | 3.8 | 7.4 |
| Feb-12-96 | 43 | 10:00 | 0.003 | 0.146 | 6.5 | 0.21 | 1.16 | LO.1 | 0.03 | 0.13 | 0.05 | 7.72 | 471 | 2-2 | 3.9 | 6.2 |
| Apr-09-96 | 100 | 11:00 | 0.0034 | 2.629 | 4.7 | 0.61 | 1.04 | 6.6 | 0.03 | 0.07 | 0.07 | 8.03 | 600 | 39.9 | 3.96 | 8.9 |

ISCO Samples

| Date | Julian Date | Time | Staff Gauge (m) | Temperature (C) | Suspended Solids (mg/L) | Free Ammonia (mg/L) | Total Kjeldahl (mg/L) | Nitrate (mg/L) | Nitrite (mg/L) | Total Phosphorous (mg/L) | Dissolved Reactive (mg/L) | pH | Conductivity (µmho/ml) | Chloride (mg/L) | Potassium (mg/L) | Sodium (mg/L) |
|-----------|-------------|-------|-----------------|-----------------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------------------|---------------------------|------|------------------------|-----------------|------------------|---------------|
| Nov-27-95 | 331 | 13:00 | 0.016 | 4.464 | 132 | 0.12 | 1.17 | 13 | 0.21 | 0.21 | 0.07 | 8.13 | 595 | 38 | 3.1 | 11.5 |
| Nov-27-95 | 331 | 19:00 | 0.028 | 4.464 | 659 | 0.1 | 3.25 | 9.1 | 0.9 | 0.06 | 0.06 | 7.81 | 477 | 27.8 | 3.79 | 7.5 |
| Nov-27-95 | 331 | 22:00 | 0.091 | 4.464 | 487 | 0.09 | 3.81 | 4.9 | 1.21 | 1.21 | 0.16 | 7.45 | 252 | 12.4 | 5.87 | 3.3 |
| Nov-28-95 | 332 | 05:00 | 0.044 | 4.341 | 177 | 0.11 | 2.38 | 6 | 0.71 | 0.71 | 0.14 | 7.56 | 296 | 16.3 | 5.78 | 5.3 |
| Nov-28-95 | 332 | 20:00 | 0.017 | 4.341 | 576 | 0.24 | 3.19 | 11 | 0.82 | 0.82 | LO.01 | 7.81 | 495 | 26.2 | 3.78 | 8.1 |
| Nov-29-95 | 333 | 11:00 | 0.017 | 3.848 | 96.7 | LO.05 | 1.17 | 13 | 0.22 | 0.22 | LO.01 | 7.99 | 582 | 30.6 | 3.32 | 9.4 |
| Mar-24-96 | 87 | 01:30 | NA | 0.774 | | | | | | | | | | | | |
| Mar-24-96 | 87 | 07:30 | NA | 0.774 | | | | | | | | | | | | |
| Mar-24-96 | 87 | 01:30 | NA | 0.774 | | | | | | | | | | | | |
| Mar-24-96 | 87 | 19:30 | NA | 0.774 | | | | | | | | | | | | |
| Mar-25-96 | 88 | 07:30 | NA | 1.574 | | | | | | | | | | | | |
| Apr-15-96 | 106 | 06:00 | 0.0048 | 4.539 | 17.5 | 0-29 | 0.81 | 6.4 | 0.08 | 0.07 | 0.02 | 8.23 | 624 | 52 | 4.4 | 11.2 |
| Apr-15-96 | 106 | 12:00 | 0.044 | 4-539 | 20.3 | 0-35 | 1.2 | 6-9 | 0.05 | 0.18 | 0.02 | 7.92 | 457 | 35.1 | 5.07 | 8.2 |
| Apr-15-96 | 106 | 21:00 | 0.037 | 4.539 | 14.2 | 0.33 | 1-09 | 7.8 | 0.04 | 0.14 | 0.02 | 7-93 | 480 | 32 | 4.7 | 7.4 |
| Apr-16-96 | 107 | 09:00 | 0.021 | 4.253 | 6.2 | 0.37 | 0.87 | 8.8 | 0.03 | 0.08 | 0.02 | 7.95 | 524 | 31.4 | 4.41 | 7.6 |
| Apr-17-96 | 108 | 03:00 | 0.007 | 5.022 | 5.4 | 0.36 | | 8.9 | 0.03 | | 0.06 | 7.9 | 558 | 31.4 | 3.82 | 7.5 |

Essex Paired Watersheds

G-1

Air Temperature and Precipitation Summary

June 1, 1995 - May 31, 1996

| Year | Month | Precipitation | | Essex | | | Woodslee | | |
|-------|-------|---------------|----------|-------|-------|-------|----------|-------|------|
| | | Essex | Woodslee | Min | Mean | Max | Min | Mean | Max |
| 1995 | Jun | 29.1 | 97.4 | 14.79 | 20.86 | 26.92 | 13.5 | 19.1 | 24.7 |
| | Jul | 109.1 | 88.6 | 17.26 | 22.62 | 27.98 | 16 | 21.65 | 27.3 |
| | Aug | 69.3 | 82.1 | 18.24 | 23.11 | 27.99 | 15.1 | 20.6 | 26.1 |
| | Sept | 29.7 | 80.7 | 9.11 | 15.44 | 21.76 | 11.7 | 17 | 22.3 |
| | Oct | 81.6 | 52.2 | 6.92 | 11.86 | 16.8 | 5.8 | 10.75 | 15.7 |
| | Nov | 67.2 | 74.1 | -2.4 | 1.37 | 5.14 | 0.8 | 4.45 | 8.1 |
| | Dec | | 80.3 | -7.71 | -3.7 | -0.32 | -5.5 | -2.25 | 1 |
| 1996 | Jan | | 51.2 | -9.53 | -4.01 | -1.31 | -9.6 | -5.9 | -2.2 |
| | Feb | | 45.7 | -8.03 | -4.0 | 0.02 | -8.4 | -4.5 | -0.6 |
| | Mar | | 70.1 | -6.65 | -1.99 | 2.68 | -2.9 | 1.2 | 5.3 |
| | Apr | 75.7 | 80.4 | 0.43 | 6.12 | 11.82 | -2.5 | 5.2 | 12.9 |
| | May | 69.6 | 72.7 | 7.74 | 11.29 | 18.06 | 1.83 | 14 | 19.8 |
| Total | | | 875.5 | | | | | | |

Essex Paired Watersheds

Total Daily Rainfall (nun) - June 1, 1995 - May 31, 1996

| DATE | JUN 95 | JUL | AUG | SEP | OCT | NOV | DEC | JAN '96 | FEB | MAR | APR | MAY |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1 | 0 | 0 | 4.3 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0.2 |
| 2 | 0.2 | 0 | 0 | 0 | 0 | 10.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 2.60 | 0 | 18.4 | 0 | 14.5 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 |
| 4 | 0 | 1 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.1 |
| 5 | 0 | 3.5 | 3.8 | 0 | 54.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 3.3 | 0 | 5.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 20.9 | 3.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.2 |
| 9 | 0.1 | 0.4 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53.9 |
| 10 | 0.4 | 0 | 0 | 0 | 0 | 3.4 | 0 | 0 | 0 | 0 | 0 | 6.8 |
| 11 | 0 | 0 | 0 | 0 | 0 | 19.8 | 0 | 0 | 0 | 0 | 0 | 0.4 |
| 12 | 0 | 0 | 0 | 8.1 | 0 | 0 | 0 | 0 | 0 | 0 | 7.3 | 0 |
| 13 | 0 | 8.9 | 9.4 | 1.8 | 0 | 0.1 | 0 | 0 | 0 | 0 | 4.2 | 0 |
| 14 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 22.6 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.5 | 3.8 |
| 16 | 0 | 17.1 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0 |
| 17 | 0 | 0 | 10.4 | 0 | 0 | 1.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 0.1 | 0 | 0 | 1.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| 20 | 0 | 5.5 | 0 | 4.8 | 2.6 | 0 | 0 | 0 | 0 | 0 | 18.1 | 0 |
| 21 | 0 | 0 | 0 | 6.8 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 |
| 22 | 0 | 2.1 | 0 | 1.1 | 0.3 | 0 | 0 | 0 | 0 | 0 | 10.7 | 0 |
| 23 | 0.2 | 8.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 0 |
| 24 | 0 | 17.3 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 |
| 25 | 2.2 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 |
| 26 | 0.1 | 21.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.1 |
| 27 | 20.7 | 0.1 | 0 | 0 | 4 | 12.8 | 0 | 0 | 0 | 0 | 0 | 0.2 |
| 28 | 1.6 | 0 | 0 | 0 | 0.4 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11.9 | 0 |
| 30 | 1 | 0 | 0 | 0 | 0.1 | 0.1 | 0 | 0 | | 0 | 9.7 | 0 |
| 31 | | 0 | 0 | | 3.7 | | 0 | 0 | | 0 | | |
| Total | 97.4 | 88.6 | 82.1 | 80.7 | 52.2 | 74.1 | 80.3 | 51.2 | 45.7 | 70.1 | 80.4 | 72.7 |

Essex Paired Watersheds

Daily Maximum Air Temperatures (°C) - June 1, 1995 - May 31 1996

| DATE | JUN '95 | JUL | AUG | SEP | OCT | NOV | DEC | JAN '96 | FEB | MAR | APR | MAY |
|------|---------|-------|-------|-------|-------|--------|--------|---------|--------|--------|-------|-------|
| 1 | 23.69 | 24.76 | 31.19 | 24.04 | 25.09 | 16.7 | 9.63 | 1.153 | -10.73 | -0.931 | 6.506 | 14.98 |
| 2 | 23.48 | 21.38 | 27.65 | 24.7 | 24.49 | 17.86 | 3.956 | -0.506 | -12.2 | 0.603 | 5.722 | 18.36 |
| 3 | 24.94 | 23.91 | 31.3 | 27.47 | 14.59 | 7.48 | 12.16 | -7.03 | -13.43 | -5.383 | 12.1 | 18.03 |
| 4 | 25.09 | 28.46 | 30.58 | 27.12 | 17.16 | 3.153 | 5.916 | -0.43 | -11.87 | -1.271 | 1.472 | 11.71 |
| 5 | 27.08 | 29.22 | 25.16 | 28.98 | 14.02 | 0.705 | 6.345 | -6.458 | -5.925 | -0.767 | 4.515 | 12.31 |
| 6 | 28.86 | 27.72 | 24.8 | 30.08 | 19.63 | 6.496 | 0.568 | -9.25 | -3.325 | -3.199 | 4.001 | 14.54 |
| 7 | 29.93 | 23.16 | 26.86 | 24.16 | 14.42 | 9.26 | -1.112 | -8.85 | 3.018 | -9.79 | 2.769 | 13.76 |
| 8 | 14.84 | 22.92 | 22.89 | 14.96 | 13.95 | 1.855 | -2.129 | -5.264 | 5.654 | -9.97 | 3.118 | 13.53 |
| 9 | 19.82 | 22.25 | 24.91 | 20.67 | 18.33 | 2.913 | -2.171 | -2.798 | 7.15 | -5.753 | 4.277 | 18.95 |
| 10 | 24.3 | 27.94 | 28.45 | 16.65 | 21.3 | 11.33 | -9.3 | -7.17 | 10.08 | -2.107 | 12.46 | 24.34 |
| 11 | 20.3 | 26.79 | 31.31 | 21.34 | 21.38 | 12.33 | -10.17 | -7.32 | 3.143 | 2.417 | 22.87 | 8.13 |
| 12 | 21.15 | 28.38 | 31.41 | 25.92 | 26.01 | -1.393 | -5.76 | -2.259 | -6.593 | 7.65 | 20.88 | 8.43 |
| 13 | 27.19 | 34.45 | 31.98 | 27.15 | 25.23 | 1.997 | -0.589 | -0.085 | -2.598 | 8.63 | 11.56 | 11.56 |
| 14 | 25.78 | 36.35 | 31.58 | 24.09 | 19.66 | 2.613 | 7.63 | 4.879 | -0.537 | 15.78 | 5.891 | 15.07 |
| 15 | 25.53 | 34.64 | 32.55 | 18.75 | 12.58 | 1.919 | 2.619 | -2.539 | -4.813 | 8.78 | 11.82 | 11.96 |
| 16 | 28.21 | 10.53 | 29.89 | 25.68 | 14.78 | 0.41 | 0.498 | 6.561 | -4.199 | 0.959 | 6.17 | 15.92 |
| 17 | 32.3 | 29.37 | 26.09 | 19.23 | 18.07 | 1.544 | 0.677 | 7.51 | -3.629 | 7.09 | 11.41 | 17.3 |
| 18 | 33.13 | 27.3 | 29.28 | 18.25 | 20.08 | 2.953 | -1.2 | 14.29 | -8.03 | 9.06 | 22.24 | 29.76 |
| 19 | 35.27 | 27.97 | 29.22 | 20.72 | 22.61 | 5.77 | -2.929 | 7.61 | 1.719 | 6.939 | 24.02 | 30.3 |
| 20 | 31.85 | 23.05 | 28.12 | 15.96 | 19.5 | 9.1 | -3.914 | -6.237 | 4.746 | -0.214 | 21.64 | 30.33 |
| 21 | 31.98 | 26.91 | 29.88 | 15.54 | 8.27 | 4.568 | 4.444 | -1.991 | 4.206 | -2.226 | 16.18 | 23.8 |
| 22 | 30.28 | 28.08 | 23.89 | 13.8 | 13.75 | 1.586 | -1.646 | 3.911 | -0.184 | 0.191 | 16.9 | 25.42 |
| 23 | 29.33 | 29.05 | 25.19 | 13.88 | 20.55 | 1.979 | -2.776 | 2.544 | 11.34 | 4.31 | 1.04 | 22.43 |
| 24 | 28.04 | 27.32 | 22.8 | 15.45 | 15.98 | -0.693 | -0.79 | 4.343 | 10.42 | 9.54 | 17.07 | 19.05 |
| 25 | 27.43 | 27.97 | 22.81 | 18.15 | 13.05 | 5.343 | -0.853 | -2.622 | 10.22 | 12.89 | 20.61 | 18.89 |
| 26 | 28.81 | 29.51 | 30.88 | 21.36 | 15.79 | 6.14 | -4.312 | 4.758 | 5.728 | -2.196 | 14.66 | 18.92 |
| 27 | 30.03 | 27.8 | 23.73 | 25.58 | 14.91 | 11.26 | -4.505 | 6.802 | 9.95 | -1.801 | 13.2 | 16.3 |
| 28 | 27.61 | 28.42 | 26.03 | 22.58 | 11.31 | 4.691 | -2.041 | -3.984 | 4.847 | 5.96 | 11.97 | 20.8 |
| 29 | 24.81 | 31.42 | 27.52 | 25.88 | 10.91 | -0.133 | -1.739 | 3.372 | -3.737 | 7.52 | 8.31 | 16.31 |
| 30 | 26.82 | 28.79 | 27.56 | 24.76 | 6.982 | 4.552 | -0.758 | -8.32 | | 10.64 | 9.03 | 20.48 |
| 31 | | 33.06 | 31.57 | | 6.772 | | 3.165 | -9.66 | | 9.67 | | |
| MEAN | 24.7 | 27.3 | 26.1 | 22.3 | 15.7 | 8.1 | 1 | -2.2 | -0.6 | 5.3 | 12.9 | 19.8 |

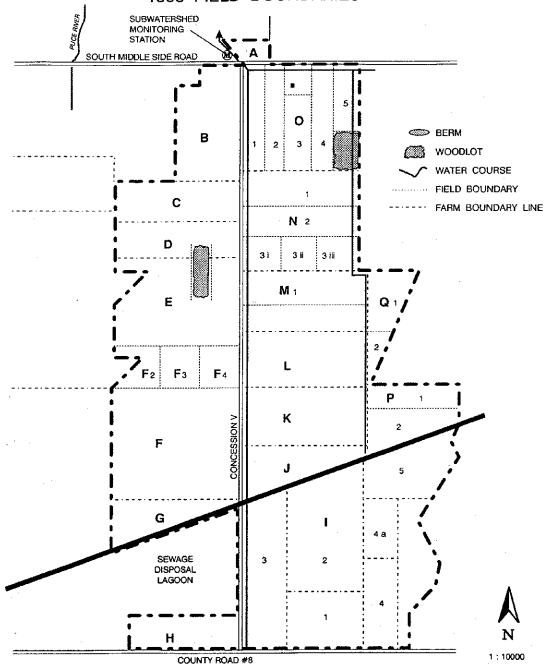
Essex Paired Watersheds

Daily Minimum Air Temperature (°C) - June 1, 1995 - May 31, 1996

| DATE | JUN '95 | JUL | AUG | SEP | OCT | NOV | DEC | JAN '96 | FEB | MAR | APR | MAY |
|------|---------|-------|-------|-------|-------|--------|--------|---------|--------|--------|--------|-------|
| 1 | 13.93 | 15.58 | 20.6 | 11.84 | 13.29 | 6.746 | -1.044 | -16.29 | -16.29 | -8.1 | -3.05 | 4.766 |
| 2 | 14.11 | 11.63 | 19.38 | 9.45 | 10.09 | 7.32 | -2.966 | -18.73 | -18.73 | -8.93 | -3.817 | 0.522 |
| 3 | 14.85 | 11.47 | 21.07 | 13.6 | 9.23 | -1.19 | -0.36 | -21.15 | -21.15 | -14.34 | -0.453 | 6.636 |
| 4 | 13.37 | 16.09 | 20.8 | 10.94 | 11.83 | -3.176 | -1.268 | -19.95 | -19.95 | -10.51 | -2.69 | 4.138 |
| 5 | 10.07 | 21.94 | 18.74 | 13.63 | 12.23 | -4.784 | -2.756 | -17.99 | -17.99 | -3.213 | -3.363 | 2.526 |
| 6 | 13.42 | 19.6 | 17.81 | 15.37 | 12.41 | -4.308 | -4.604 | -16.16 | -16.16 | -10.34 | -5.364 | 6.727 |
| 7 | 11.53 | 12.98 | 18.48 | 11.39 | 9.21 | 1-255 | -10.5 | -3.966 | -3.966 | -13.87 | -6.755 | 5.287 |
| 8 | 8.5 | 11.51 | 19.8 | 9.37 | 6.23 | -4.619 | -12.63 | 2.206 | 2.206 | -16.35 | -6.069 | 9.27 |
| 9 | 10.54 | 15.27 | 19.85 | 7.57 | 5.148 | -6.783 | -17.18 | 0.29 | 0.29 | -18.24 | -5.46 | 8.42 |
| 10 | 14.63 | 13.36 | 18.24 | 6.162 | 9.45 | 2.495 | -15.86 | 0.473 | 0.473 | -14.49 | -1.809 | 5.412 |
| 11 | 13.03 | 15.86 | 22.5 | 3.903 | 6.249 | -2.905 | -16.19 | -6.819 | -6.819 | -8.22 | 0.897 | 2.418 |
| 12 | 10.37 | 13.41 | 21.55 | 7.29 | 11.34 | -4.53 | -13.12 | -11.05 | -11.05 | -6.70 | 5.578 | 1.067 |
| 13 | 8.02 | 20.25 | 19.32 | 19.6 | 10.93 | -2.063 | -12.14 | -11.66 | -11.66 | -0.727 | 1.513 | -0.23 |
| 14 | 12.33 | 21.09 | 21.55 | 12.93 | 6.799 | -5.453 | -0.807 | -6.673 | -6.673 | 1.351 | -0.88 | 3.312 |
| 15 | 9.12 | 20.17 | 22.17 | 7.1 | 4.778 | 4.426 | -0.248 | -13.89 | -13.89 | -2.339 | 1.148 | 7.82 |
| 16 | 11.1 | 20.06 | 20.98 | 7.86 | 2.426 | -3.849 | -6.392 | -16.2 | -16.2 | 4.546 | 0.275 | 8.91 |
| 17 | 13.37 | 20.78 | 20.66 | 11.73 | -1.7 | -3.269 | -7.56 | -10.79 | -10.79 | -3.493 | -0.559 | 9.78 |
| 18 | 18.12 | 16.91 | 20.82 | 6.074 | 9.8 | 0.778 | 4.754 | -17.61 | -17.61 | -1.181 | 0.86 | 14.29 |
| 19 | 19.91 | 15.59 | 18.04 | 6.451 | 8.78 | -0.019 | -6.874 | -8.38 | -8.38 | -0.673 | 7.46 | 20.1 |
| 20 | 20.02 | 19.72 | 15-12 | 11.77 | 5.071 | 1.157 | -8.65 | 1.143 | 1.143 | -3.124 | 9.86 | 16.32 |
| 21 | 17.61 | 17.6 | 17.38 | 9.74 | 2.64 | -2.301 | -11.11 | -1.56 | -1.56 | -7.29 | 6.945 | 14.65 |
| 22 | 16.52 | 19.32 | 13.37 | 1.716 | 3.245 | -5.116 | -11.46 | -2.135 | -2.135 | -8.53 | 6.95 | 11.21 |
| 23 | 17.42 | 21.06 | 11.58 | 0.731 | 4.946 | -4.626 | 4.073 | -0.635 | -0.635 | -6.805 | -0.046 | 12.55 |
| 24 | 19.09 | 19.52 | 14.45 | 3.104 | 6.232 | -7.93 | -5.013 | 1.46 | 1.46 | -3.768 | -0.327 | 7.79 |
| 25 | 18.32 | 18.93 | 13.91 | 4.667 | 5.029 | 4.443 | -6.671 | 1.025 | 1.025 | -2.751 | 5.283 | 6.439 |
| 26 | 17.78 | 18.86 | 13.5 | 6.536 | 5.184 | -3.213 | -10.64 | 0.19 | 0.19 | -10.83 | -0.263 | 9.63 |
| 27 | 18.56 | 18.45 | 17.7 | 10.42 | 9.48 | 1.939 | -15.62 | 0.492 | 0.492 | -10-89 | -1.693 | 10.03 |
| 28 | 19.2 | 20.68 | 15.28 | 9.46 | 4.931 | -3.853 | -8.14 | -7.94 | -7.94 | 4-072 | 0.297 | 8.79 |
| 29 | 18.69 | 19.03 | 17.02 | 8.9 | 2.787 | -6.282 | -8.31 | -10.47 | -10.47 | -0.784 | 4.589 | 7.97 |
| 30 | 17.15 | 14.93 | 14.7 | 13.97 | 3.117 | 4.551 | -9.12 | | | -2.066 | 3.885 | 5.528 |
| 31 | | 13.3 | 18.93 | | 3.436 | | -2.808 | | | -0.444 | | |
| MEAN | 13.5 | 16 | 15.1 | 11.7 | 5.8 | 0.8 | -5.5 | -9.6 | -8.4 | -2.9 | -2.5 | 8.3 |

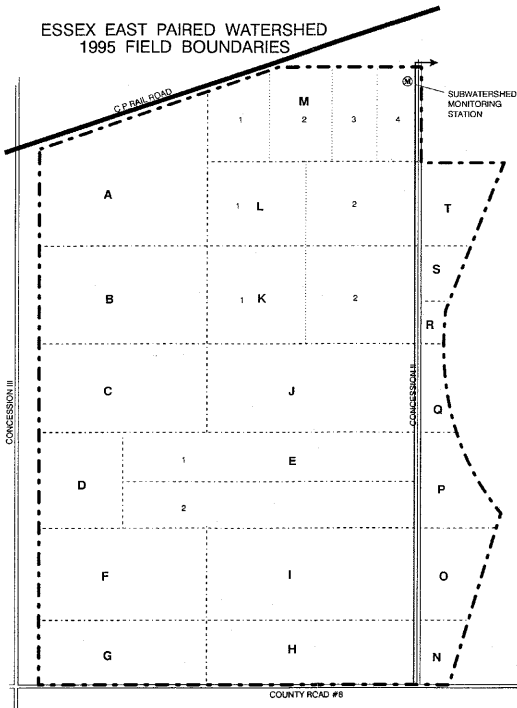
ESSEX PAIRED WATERSHEDS

ESSEX WEST PAIRED WATERSHED 1995 FIELD BOUNDARIES



ESSEX PAIRED WATERSHEDS

ESSEX EAST PAIRED WATERSHED 1995 FIELD BOUNDARIES



ESSEX
1995/96 Field Activities

H-2

Western Sub-basin (5th. Conc. Drain)

| Landowner | Field # | Acres | 1995 Fall Tillage 1996 Spring Tillage | 1995 Crop |
|------------------|----------------|--------------|--|----------------------|
| Farm A | 1 | 4 | No-Till | Soybeans |
| Farm B | 1 | 49 | Fall- 3K-2X | Soybeans |
| Farm C | | 50 | Fall- Mouldboard Plow Spring- Triple K-2X | Winter Wheat |
| Farm D | 1 | 8 | Spring- Cultivate 3K-2X Fall- Disk/Cult-2X | Winter Wheat |
| | 2 | 15 | Disk- 2X- harrow | Soybeans |
| | 3 | 15 | Cult-S/tine, 2X, Packed | Soybeans |
| | 4 | 5 | Spring- Cultivate 3K-2X Fall- Disk/Cult-1X | Winter Wheat |
| Farm E | 1 | 24 | Spring-Cultivate 2X Tooth Cultivator | Fallow |
| | 2 | 19 | Disked IX, Cult IX | Winter Wheat |
| | 3 | 8 | Disked 1X | Winter Wheat |
| | 4 | 20 | Disked 1X, Cult 1X | Winter Wheat |
| Farm F | 1 | 30 | Spring- Disk 2X | Winter Wheat |
| | 2 | 30 | Spring- Disk 2X | Winter Wheat |
| | 3 | 15 | Spring- Disk 2X | Winter Wheat |
| | 4 | 24 | Spring- Disk 2X | Winter Wheat |

| | | | | |
|--------|-------|----|---|--------------|
| Farm G | 1 | 18 | Fall- MPlow Disked 1X Spring- Cult- 2X | Winter Wheat |
| Farm H | 1 | 23 | Fall- Cultivated 1 X Spring- 3K-2X | Soybeans |
| Farm I | 1 | 15 | No-Till | Soybeans |
| | 2 | 35 | No-Till | Soybeans |
| | 3 | 50 | Fall-Chisel Plow | Corn |
| | 4 | 30 | No-Till | Soybeans |
| | 4a | 10 | Disk-1X | Winter Wheat |
| | 5 | 93 | No-Till | Soybeans |
| Farm J | 1 | 23 | Fall- Chisel Plow | Corn |
| Farm K | 1 | 42 | Fall-Mouldboard Plow Spring-Cultivate 1X | Soybeans |
| Farm L | 1 | 47 | No-till | Winter Wheat |
| Farm M | 1 | 24 | Fall- Chisel Plow Spring- S/tine-2X | Soybeans |
| | 2 | 24 | Fall-Chisel Plow Spring- S/tine-2X | Soybeans |
| Farm N | 1 | 21 | Fall- No Till Spring- IX-S/tine Cult | Soybeans |
| | 2 | 16 | Fall- No Till Spring- 1X-S/tine Cult | Soybeans |
| | 3i) | 10 | Fall- Chisel Plow Spring- 2X-S/tine Cult | Hay |
| | 3ii) | 10 | Fall- No Till Spring- 2X-S/tine Cult | Soybeans |
| | 3iii) | 16 | Fall- No Till Spring- 2X-S/tine Cult | Soybeans |

| | | | | |
|--------|---|----|--|--------------|
| Farm 0 | 1 | 10 | No-Till | Corn |
| | 2 | 16 | No-Till | Winter Wheat |
| | 3 | 16 | No-Till | Corn |
| | 4 | 19 | No-Till | Corn |
| | 5 | 10 | No-Till | Hay |
| Farm P | 1 | 36 | Fall- No-Till Spring- No-Till/Planter | Soybeans |
| | 1 | 8 | Fall- No-Till | Winter Wheat |
| Farm Q | 2 | 4 | Spring- 3X-Cult/packed | Soybeans |

ESSEX
1995/96 Field Activities

H-5

Western Sub-basin (2nd. Conc. Drain)

| Landowner | Field # | Acres | 1995 Fall Tillage 1996 Spring Tillage | 1995 Crop |
|-----------|---------|-------|--|----------------|
| Farm A | 1 | 68 | Fall- Mouldboard plow Spring- Cult/Packed | Winter Wheat |
| Farm B | 1 | 50 | Fall- plow Spring- Cult/Packed | Soybeans |
| Farm C | 1 | 50 | Fall- plow Spring- Cult/packed | Corn |
| Farm D | 1 | 23 | Fall- plow Spring-3-K 2X | Winter Wheat |
| Farm E | 1 | 40 | Fall- Mouldboard Plow Spring- 3K/packer-2X | Hard Red Wheat |
| | 2 | 40 | Fall- Mouldboard Plow Spring- 3K/packer-2X | Hard Red Wheat |
| Farm F | 1 | 50 | Fall- plow Spring- Cult/packed | Soybeans |
| Farm G | 1 | 28 | No-Till | Soybeans |
| Farm H | 1 | 30 | Fall-Land levelled/ 2X Spring- No till | Corn |
| Farm I | 1 | 49 | Spring- Disk 1X Fall- plow | Corn |
| Farm J | 1 | 20 | Fall- Mouldboard plow Spring- S/tine Cult-2X | Corn |
| | 2 | 26 | Fall- Mouldboard plow Spring- S/tine, Cult-2X | Corn |

| | | | | |
|--------|---|------|--|------------------------------|
| Farm K | 1 | 35 | Spring- Cult/packed Fall- plow | Soybeans |
| | | 15 | ----- | Natural Vegetation (Bush) |
| Farm L | 1 | 47.5 | Fall- Disk 1X | Soybeans |
| Farm M | 1 | 44 | Fall- No-Till | Winter Wheat |
| Farm N | 1 | 12 | Fall- Mouldboard Plow Spring 3-K-2X | Soybeans |
| Farm O | 1 | 10 | Fall- Mouldboard Plow Spring 3K-2X | Corn |
| Farm P | 1 | 7 | Fall- Mouldboard Plow Spring- 3K-3X | Soybeans |
| Farm Q | 1 | 5 | Spring- Cultivate 3X Fall- plowed | Winter Wheat |
| Farm R | 1 | 10 | Fall- plowed/packed 1X | Winter Wheat |
| Farm S | 1 | 25 | Fall- Mouldboard Plow Spring- disk/cultivated | Corn |
| Farm T | 1 | 15 | Fall-mouldboard plowed Spring 3k-2x | Corn |

Essex Region Conservation Authority

Routine Grab Samples (west)

| Sample Date | Julian Date | Staff Gauge s (m) | Suspended Solids (mg/l) | Ammonia (mg/l) | Total Kjeldahl (mg/l) | Nitrite (mg/l) | Nitrate (mg/l) | Total Phosphorus (mg/l) | Dissolved Reactive (mg/l) | pH | Conductivity (µhmo/ml) | Chloride (mg/l) | Potassium (mg/l) | Sodium | Calculated Hardness (mg/l) |
|-------------|-------------|-------------------|-------------------------|----------------|-----------------------|----------------|----------------|-------------------------|---------------------------|------|------------------------|-----------------|------------------|--------|----------------------------|
| Jun-28-95 | 179 | | 182 | 1.08 | 4.09 | 0.38 | 19.1 | 0.45 | 0.25 | 7.58 | 562 | 26.8 | 3.26 | 7.5 | 239 |
| July-19-95 | 200 | 2.088 | 5 | 0.17 | 1.02 | 0.02 | 0.1 | 0-09 | 0-03 | 8.03 | 1029 | 108 | 3.66 | 43-4 | 401 |
| Aug-2-95 | 214 | 2.071 | 7.1 | 0.08 | 1.07 | 0.03 | 0.3 | 0,04 | OM | 8.16 | 1189 | 220 | 3.19 | 8-1.7 | 4419 |
| Aug-23-95 | 235 | 2.069 | 5 | 0-06 | 1.14 | 0.03 | 0.3 | 0,71 | 0.53 | 8.24 | 1600 | 328 | 6.98 | 103 | 486 |
| Oct-11-95 | 284 | | 5 | 0.11 | 0-89 | 0.04 | 2.3 | 0.13 | 0.06 | 8.2 | 1160 | 1,46 | 6.05 | 64.7 | 453 |
| Oct-31-95 | 304 | | 7.5 | 0.56 | 1,69 | 0.03 | 0-7 | 0.15 | 0.01 | 7.93 | 1600 | 256 | 7.44 | 91.3 | 51.5 |
| Nov-16-95 | 320 | | 3.8 | 0,09 | 0.84 | 0.02 | 8.2 | 0-1 | 0.03 | 8 | 793 | 43-2 | 2.33 | 15.9 | 3-4 |
| Dec-5-95 | 339 | | 2.9 | | 0,65 | 0.04 | 5.6 | 0.16 | 0.07 | 8.11 | 943 | 63.5 | 1.84 | 21.9 | 43 1 |

Storm Event Samples (west)

| Sample Date | Julian Date | Time | Suspended solids (mg/l) | Free Ammonia (mg/l) | Total Kjeldahl (mg/l) | Nitrite (mg/l) | Nitrate (mg/l) | Total Phosphorous (mg/l) | Dissolved Reactive (mg/l) | pH | Conductivity (µhmo/ml) | Chloride (mg/l) | Potassium (mg/l) | Sodium (mg/l) | Calculated Hardness (mg/l) |
|-------------|-------------|-------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------------------|---------------------------|------|------------------------|-----------------|------------------|---------------|----------------------------|
| Oct-6-95 | 279 | 17:00 | 247 | 9.99 | 27.3 | 0.34 | 1.21 | 2.4 | 0.02 | 6.91 | 1710 | 319 | 9.17 | 143 | 402 |
| Oct-6-95 | 279 | 21:00 | 91 | 0.4 | 2.38 | 0.04 | 4.53 | 0.54 | 0.2 | 7.06 | 1263 | 257 | 10.8 | 92.2 | 345 |
| Oct-6-95 | 279 | 01:00 | 213 | 0.2 | 2.95 | 0.06 | 7.8'4 | 1-08 | 0.28 | 7.01 | 646 | 106 | 7.82 | 40.4 | 224 |
| Oct-6-95 | 279 | 05:00 | 139 | 0.07 | 3.08 | 0.03 | 9.35 | 0.194 | 0.09 | 6.88 | 476 | 47.3 | 4.58 | 15.3 | 174 |
| Oct-6-95 | 279 | 07:00 | 113 | 0.07 | 2.63 | 0.03 | 10.7 | 1.08 | 0.03 | 6.91 | 499 | 56.3 | 4.59 | 19.1 | 193 |

Essex Region Conservation Authority

Routine Grab Samples (east)

I-2

| Sample Date | Julian Date | Staff Gauge (m) | Suspended Solids (mg/l) | Free Ammonia (mg/l) | Total Kjeldahl (mg/l) | Nitrite (mg/l) | Nitrate (mg/l) | Total Phosphorous (mg/l) | Dissolved Reactive (mg/l) | pH | Conductivity (µhmo/ml) | Chloride (mg/l) | Potassium (mg/l) | Sodium (mg/l) | Calculated Hardness (mg/l) |
|-------------|-------------|-----------------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------------------|---------------------------|------|------------------------|-----------------|------------------|---------------|----------------------------|
| Jun-28-95 | 179 | | 70.5 | 0-2 | 1.48 | 0.33 | 12.8 | 0.32 | 0.18 | 7.66 | 689 | 57.5 | 4.06 | 17.5 | 286 |
| July-19-95 | 200 | | 6.6 | 0.05 | 1.26 | 0-06 | 0.3 | 0.11 | 0.02 | 7.92 | 1274 | 171 | 5.07 | 60.1 | 452 |
| Aug-2-95 | 214 | | 5.7 | 0.08 | 1.08 | 0.01 | 0.4 | 0.04 | 0.01 | 7.87 | 1480 | 258 | 6.39 | 86.2 | 581 |
| Aug-23-95 | 235 | | 147 | 0.05 | 2.59 | 0.01 | 0.3 | 0.46 | 0.02 | 7.72 | 1800 | 368 | 4.75 | 105 | 560 |
| Oct-11-95 | 284 | | 5.3 | 0.17 | 1.29 | 0.08 | 2.2 | 0.15 | 0.08 | 7.99 | 1129 | 127 | 5-11 | 51 | 481 |
| Oct-31-95 | 304 | | 39.4 | 0.16 | 1-25 | 0-01 | 0.1 | 0.12 | 0.01 | 7-81 | 1750 | 290 | 10.7 | 91.1 | 598 |
| Nov-16-95 | 320 | | 6.8 | 0-12 | 1-03 | 0-05 | 9-4 | 0.11 | 0-05 | 7.91 | 880 | 68-4 | 3-39 | 19.9 | 394 |
| Dec-5-95 | 339 | | 4.3 | 0.18 | 0.6 | 0.02 | 2.9 | 0.11 | | 8.1 | 1071 | 122 | 3.53 | 34.6 | 455 |

Storm Event Samples (east)

| Sample Date | Julian Date | Time | Suspended Solids (mg/l) | Free Ammonia (mg/l) | Total Kjeldahl (mg/l) | Nitrite (mg/l) | Nitrate (mg/l) | Total Phosphorous (mg/l) | Dissolved Reactive (mg/l) | pH | Conductivity (µhmo/ml) | Chloride (mg/l) | Potassium (mg/l) | Sodium (mg/l) | Calculated Hardness (mg/l) |
|-------------|-------------|-------|-------------------------|---------------------|-----------------------|----------------|----------------|--------------------------|---------------------------|------|------------------------|-----------------|------------------|---------------|----------------------------|
| Oct-6-95 | 279 | 17:00 | 25.8 | 0.09 | 1.51 | 0.02 | 1.28 | 0.28 | 0.05 | 7.13 | 2290 | 485 | 12.2 | 158 | 687 |
| Oct-6-95 | 279 | 21:00 | 19.2 | 0.38 | 1.27 | 0.05 | 1.46 | 0.37 | 0.24 | 7.32 | 1460 | 296 | 10.4 | 107 | 398 |
| Oct-6-95 | 279 | 01:00 | 30.4 | 0.12 | 1.45 | 0.12 | 10.6 | 0.28 | 0.18 | 7.39 | 899 | 151 | 8.42 | 52 | 328 |
| Oct-6-95 | 279 | 05:00 | 91.2 | 0.07 | 1.88 | 0.04 | 14-9 | 0.34 | 0.1 | 7.16 | 696 | 81.7 | 5.27 | 26.3 | 280 |
| Oct-6-95 | 279 | 07:00 | 82.2 | 0-08 | 2.28 | 0.04 | 14.4 | 0.39 | 0.07 | 7-22 | 696 | 81.5 | 4.85 | 25-4 | 266 |