

**UPPER THAMES RIVER LIVESTOCK  
MANURE AND WASTE MANAGEMENT PROGRAM**

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For: Ministry of Environment  
Southwestern Region



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### **3. TERMS OF REFERENCE**

Under the terms of the contract to the Southwestern Region, the UTRCA agreed to provide assistance to the Ministry of the Environment in the following tasks:

- 1) promotion of corrective livestock manure management measures for farms previously identified as causing water quality impairment.
- 2) the recording and monitoring of water quality in rural watersheds.
- 3) record and monitor upstream and downstream conditions of receiving waters as a result of rural sources. Document results.
- 4) continue monitoring background and runoff event conditions of Kintore Creek sub-basins.
- 5) assess the extent and severity of domestic waste treatment system deficiencies.

The Program was also to include the following services:

- a) liaison with local Beaches Steering Committee, the S.W. Region Abatement section and the Joint Soil & Water Conservation Program to bring about solutions.
- b) increase farmers awareness of OSCEPAP and the MOE enhancement of OSCEPAP.
- c) define and measure the water quality impact of certain problem farms, including sample collection of MOE analysis.
- d) record implementation of corrective measures and measure the resulting improvements.
- e) contact all dairy operators in the study area to promote installation milkhouse water handling systems.
- f) report to MOE problem situations which present difficulty or involve gross negligence in causing pollution.
- g) participate on local meetings and discussions on farm pollution to promote corrective measures.
- h) produce press releases for local distribution and provide a livestock manure management display at relevant events.

## 4. 1987 WORK PROGRAM

### 4.1 Promotion of Corrective Livestock Measures

A significant portion of the 1987 work program involved the promotion of corrective measures on livestock operations in the Upper Thames watershed. Staff worked closely with the local Beaches Strategy Program on this project. A total of 850 livestock operations were approached during the year. These farms had either been targeted from previous survey work (Hayman and Merkley, 1986) or were dairy operations.

#### Method

Staff used a three step approach to begin the promotional task. The first step involved the compilation and distribution of an information/education package. Once mailed the packages were followed up with a farm call. If the landowner expressed interest in any remedial measures, an addition call was made by more technically experienced staff.

#### Informative Packages

The information packages were intended to raise the farmers level of awareness to livestock related pollution. They contained information that was specific problem previously identified on his farm. The packages included the following items:

- 1) covering letter
- 2) OSCEPAP brochure
- 3) MOE Enhancement insert
- 4) Series of 3 fact sheets.

The factsheets (fig. 1,2,3) were intended to emphasize the effect livestock inputs have on water quality. The enhancement insert (fig. 4) was produced and included to clarify the grant system.

#### Farm Calls

Before farms calls were made, staff were trained to recognize potential livestock related pollution sources. Manure storage systems were toured, wind screen surveys of livestock farms were conducted and various situations were discussed with experienced staff.

The farm calls were conducted on a Township by Township basis. The farmer was represented with promotional literature explaining corrective measures. The grant was discussed and a brief questionnaire was completed.

## MANURE STORAGE FACTS

### Did You Know That .....

- based on conservative OMAF figures, enough manure Nitrogen is produced in Ontario to supply  $\frac{1}{2}$  of the Province's corn chop requirements.
- through proper manure management and cropping practices, home farmers are finding that they can reduce or eliminate the amount of commercial fertilizer previously bought...
- one cow produces about \$95.00 worth of nutrients per year, Middlesex, Oxford and Perth counties produce \$11,000,000. worth!
- about  $\frac{1}{2}$  of the Nitrogen and  $\frac{2}{3}$  of the Potassium are in the liquid portion.
- runoff from open feedlots and manure storages can carry 40-60% of the Nitrogen and 30-50% of the Potassium - containing this runoff will reduce nutrient losses and prevent potential bacterial contamination of nearby water courses.
- manure application followed by immediate incorporation decreases nitrogen -losses up to 70%.



For Information call ...  
Rural Water Quality Program  
Upper Thames River Conservation Authority  
451 — 2800

**Figure 1:** Manure Storage Facts Information Sheet

## CATTLE ACCESS FACTS

### Did You Know That .....

- *one cow produces approximately 5.4 billion fecal coliforms /day. If a cow is allowed to graze for a 24 hour period, with unrestricted access to a stream, approximately 565 million fecal coliforms could enter the stream!*
- *one defecation by a dairy cow produces enough bacteria to make the equivalent of six backyard swimming pools unsafe for swimmers!*
- *water with a 'fecal coliform' count of 100/100 ml, is unsafe to swim in...*
- *fifty cows allowed unrestricted access to a stream for a 24 hour period could contaminate the equivalent of one days untreated water supply for a city the size of Toronto!*
- *waters with a 'fecal coliform' count of 2/100 ml, is unsafe to drink...*
- *bacteria entering the stream can result in disease transmission between and within Livestock herds especially mastitis and dysentery.*
- *livestock fencing and alternative watering facilities prevent stream bank erosion and the need for expensive drain maintenance work.*



For Information call ...  
Rural Water Quality Program  
Upper Thames River Conservation Authority  
451 — 2800

**Figure 2:** Cattle Access Facts Information Sheets

## MILKHOUSE WASTE FACTS

### Did You Know That....

- 30 to 40 kg of phosphorus is used annually by each dairy farmer to wash milking equipment... this is the equivalent of pouring 600,1-kg boxes of laundry detergent into the drain each year!
- Canada/USA have agreed to reduce phosphorus loadings to Lake Erie from Agricultural sources by 200 tonnes/year.
  - an estimated 200 tonnes enters rivers annually from milkhouse waste waters alone!
  - 200 tonnes is the equivalent of dumping 6.2 million boxes of laundry soap into Ontario streams.
- phosphorus is the 'nutrient' which 'causes excessive weed growth and algae blooms in rivers and lakes...these conditions adversely affect fish populations and limit recreational activity.
- bacteria in milkhouse waste waters can transmit disease to Livestock watering downstream.
- some surveys indicate that 80-90% of all dairy operations in Ontario do not have proper milkhouse waste handling facilities!



For Information call . . . Rural Water Quality Program  
Upper Thames River Conservation Authority  
451 - 2800

**Figure 3:** Milkhouse Waste Facts Information Sheets

## Enhanced OSCEPAP II

The Ontario Ministry of Environment is pleased to participate in a co-operative grant program with the Ontario Ministry of Agriculture and Food. Under the terms of the agreement, the Ministry of Environment (MOE) will supplement OSCEPAP II grants paid by the Ministry of Agriculture and Food in target watersheds within the province, identified by MOE.

### Purpose of Enhanced OSCEPAP II

To provide additional grant assistance to livestock operators to maximize nutrient value from manure and to protect downstream water resources, particularly recreational beaches.

### Terms and Funding

All terms of OSCEPAP II must be met. Additional funding is available if all or part of your livestock farm falls within the Upper Thames River Conservation Authority watershed.

The Ministry of Environment has committed an additional 1.0 million dollars for each fiscal year from April 1st, 1986 to March 31st, 1990.

If the project qualifies under the OMAF OSCEPAP II grant and conditions are met for the MOE Enhanced OSCEPAP II grant, the additional funds will be paid automatically along with the OMAF basic payment. You do not have to apply separately to the Ministry of Environment.

In summary, simply follow the application procedures outlined in the OMAF OSCEPAP II brochure.

### The Program

Enhanced OSCEPAP II applies to portions of two sections:

- A. Soil Conservation
- B. Environmental Protection

#### A Soil Conservation

— Enhanced Eligible Items

- Water diversions around livestock lot areas
- Fencing off ditches/watercourses from livestock
- Alternate livestock water devices
- Controlled access ramps and fencing for in-channel livestock watering

- Seeding and sodding buffer strips between feedlot / barnlot areas and watercourse

### Amount of Assistance for Section A

The Enhanced OSCEPAP II increases the grant from 66% to 75% for the eligible Soil Conservation items listed above. As well, the total maximum grant for these items increases from \$10,000 to \$14,500 per farmer, partnership or corporation.

#### B Environmental Protection

- Enhanced Eligible Items

- Liquid and semi-solid manure storage tanks
- Earthen storages
- Dry or solid manure storage pads
- Transfer piping
- Storage covers for liquid, semi-solid dry, or solid manures to reduce rain, snow or odours
- Milkhouse and parlour washwater handling facilities including expansion of manure storage, holding tanks, lagoons, transfer piping and sediment tank/stone filled treatment trench systems

### Amount of Assistance for Section B

The Enhanced OSCEPAP II increases the maximum total grant from \$7,500 to \$12,500 per farmer, partnership or corporation for the eligible Environmental Protection items listed above. The percentage for Section B is unchanged from the standard OSCEPAP II percentage of 40%.

For more information contact:

Your Local OMAF Office:

Middlesex	OR
50 King Street	
London, Ontario	
N6A 2P2	Ministry of Environment
Oxford	Rural Water Quality Program
P.O. Box 666	Upper Thames River
Woodstock, Ontario	Conservation Authority
N4S 7Z5	P.O. Box 6278, Stn. D
Perth	London, Ontario
413 Hibernia Street	N5W 5S1
Stratford, Ontario	(519) 451-2800
N5A 5W2	

Figure 4 : Ministry of Environment Enhancement Brochure

The questionnaire (Appendix 1) was designed to help determine the extent of the pollution potential from the livestock related sources. The information was also used to put a dollar estimate on the cost of complete implementation of all remedial measures (appendix 2).

#### Additional Farm Calls

If the landowner expressed an interest in some type of remedial work, a second farm call was arranged. Experienced technical staff reviewed various options with the farmer. Depending on the magnitude of the project, steps were taken to correct the problem. Generally, cattle access and milkhouse waste problems were handled by Authority staff, manure storage projects were passed along to the County Agricultural Engineer. Records of all farm calls are kept on file for future reference.

Of the 850 livestock operations visited during the year, approximately  $\frac{1}{3}$  could no longer be considered a problem. In these cases the operation had either been converted to cash crop or remedial measures had been implemented. An additional  $\frac{1}{3}$  could not be reached. Either the farmer was not at home when the farm call was scheduled, or they were unavailable at the time the call was made. Therefore, follow-up work must be conducted during the upcoming field season.

#### 4.2 Havelock Sanitary Study

Three municipal drains join to form Havelock Creek at the hamlet of Havelock Corners (fig. 5). The creek outlets into Pittock Reservoir near the main beach at the northwest corner of the lake.

The creek has long been suspected of contributing to the high bacteria counts at the beach. Water samples analysed from the creek have contained very high Fecal-coliform/ fecal *Streptococci* ratios. The high ratio is a strong indicator of a human contamination. In addition to the high ratios, *Pseudomonas aeruginosis* bacteria was present in the samples. *Pseudomonas* is a positive indication of human related contamination.

As a result of these findings, investigations were conducted during the summer of 1987 to locate and correct sources of human contamination in the Havelock Creek.

## Sampling Program

Twelve sampling stations were established in the creek (fig. 5). Samples were collected on a weekly basis throughout the months of May and June. The samples were analysed for indicator bacteria. After the 2 months of sampling, there was only one occurrence of human related contamination.

## Sanitary Survey

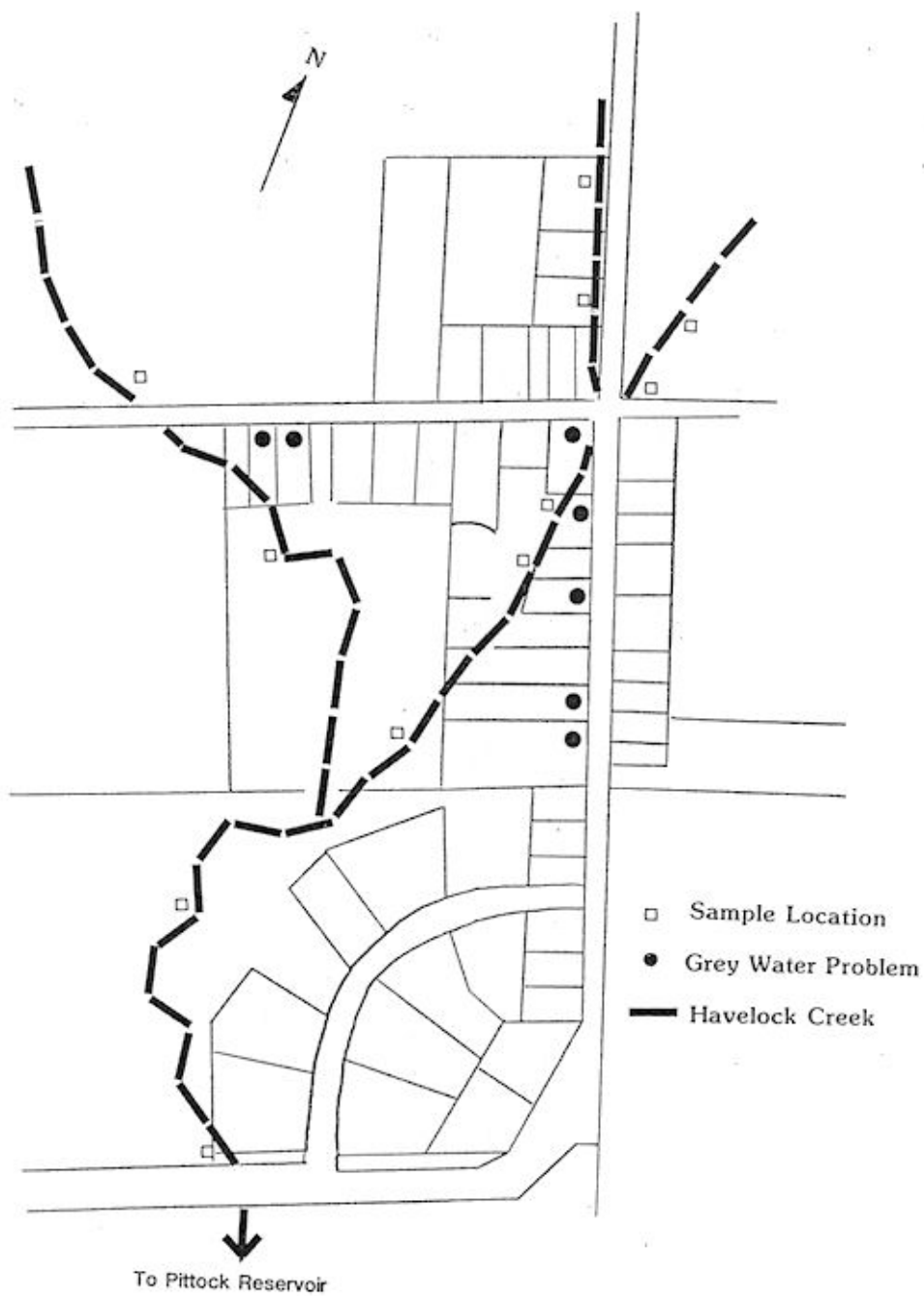
Although the sampling program failed to detect any indication of human contamination, a follow-up sanitary survey was conducted in Havelock Corners. Basements were inspected for improper hookups, dye tests were conducted on suspect septic systems, distances from weeping beds to wells were noted and in some cases well waters were tested.

Fifty three residences were surveyed, seven problems were located (fig. 5). In each case, grey water was being discharged directly to the creek. None of the seven residences were aware that the situation was improper. In each case, steps were taken to hook the illegal tile up to the septic tank.

## Summary

Although samples collected in previous years have indicated human contamination of the creek, the 1987 sampling program failed to find the sample results. Extremely dry weather experienced in the summer of 1987 could account for these results. Lack of soil moisture could prevent septic seepage from reaching the creek. During wet weather, seepage could move towards the creek through the saturated soils more easily. Samples collected from the creek during these conditions would isolate the problem.

# HAVELOCK CORNERS



**Figure 5:** Havelock Corners

### 4.3 Kintore Creek Watershed Study

Background and runoff event conditions were monitored in both the eastern and western sub-basins of Kintore Creek. A full report on the year's activities is available in appendix 2.

### 4.4 Additional Studies

A number of other studies were carried out in accordance with the terms of reference. Most were in conjunction with the local Beaches Strategy Program. Studies included:

- 1) monitoring rural water quality through a pond study.
- 2) impact assessment of milkhouse waste water on rural water courses.
- 3) assessment of milkhouse waste treatment systems.
- 4) investigation of suspect drainage tile outlets and fish hill.

Details of these particular studies can be found in the 1987 Beaches Summary Report (Hayman/Briggs).

**APPENDIX 1: QUESTIONNAIRE USED TO SURVEY HIGH PRIORITY  
LIVESTOCK OPERATORS**

# Rural Water Quality Program



## Upper Thames River Conservation Authority

PO. Box 6278, Stn "D", London, Ontario  
N5W 5S1 Telephone 451-2800

TOWNSHIP: \_\_\_\_\_  
Map No. : \_\_\_\_\_

DATE: \_\_\_\_\_  
NAME: \_\_\_\_\_ LOT: \_\_\_\_\_ CONCESSION: \_\_\_\_\_

<u>LIVESTOCK</u>	<u>TOTAL NUMBER</u>	<u>TYPE &amp; NUMBER</u>
None	_____	
Dairy	_____	Dry ____ Milking ____ Heifer ____ Calf ____
Beef - Cow-Calf; Feeder	_____	Cow ____ Calf ____
Swine - Farrow; Feeder; Farrow to Finish (in the barn)	_____	Sow ____ Weiner ____ Hog ____
Poultry - Broiler; Laying; Pullet (in the barn)	_____	
Horses	_____	
Sheep	_____	
Other	_____	

<u>Tiled Acres</u>	<u>Acres</u>	<u>Manure Spread</u>
None	_____	_____
Random	_____	_____
Systematic	_____	_____

<u>Manure Storage</u>	<u>Dimensions</u>	<u>Description</u>	<u>Is</u>	<u>Pond</u>
Dry		Pad - Concrete; Walls - Concrete; Earthen	Runoff- Contained	Pond Tank
Liquid		Covered; Tank - Above; Lagoon In		
Semi Solid		Covered; Pad - Concrete; Walls - Earthen	Concrete Earthen	
Feedlot		Covered; Pad - Concrete; Walls - Earthen	Is Runoff- contained	Pond Tank

Potential Problems

Comments: \_\_\_\_\_

Storage

distance to water ; slope ; grass cover (%) ; add. water (land, or: roof dimensions)

Feedlot

Manure Management

<u>Spreading</u>	<u>Capacity</u>	<u>Application Rate</u>	<u>When</u>	<u>Incorporate When</u>
------------------	-----------------	-------------------------	-------------	-------------------------

Box

Liquid

Injection

Irrigation

Other

How Often

Soil Test

Manure Test

Livestock Access:

# of Animals

Length of Year

Time each Day

Length of  
Watercourse

1 side/2 sides

Unlimited

Limited

Restricted

Current water supply

barn; stream ; trough ; nose pump.; other

Possible alternates

Dairy

Treatment

Cycles

Volume/  
Milking

Type of  
System

Milkhouse

None

Presan

Parlour

Manure

Rinse

Trench

Wash

Lagoon

Acid

Other

Bulk Tank

Grant

Interested

Reasons: \_\_\_\_\_

Not Interested

**APPENDIX 2:**

- A) EXTENT OF POLLUTION POTENTIAL FROM UPDATE REPORT**
- B) COST ESTIMATE OF REMEDIAL MEASURES**

## Township Summary of Identified Pollution Sources from the 1987 Survey of High Priority Livestock Operations

	Biddulph	Blanshard	Downie	East Zorra Tavistock	Ellice	Fullarton	Hibbert	Logan	North Easthope	South Easthope	Usborse	West Nissouri	Total
<b>FARM SURVEY</b>													
Confirmed High Priority	2	33	54	63	31	31	5	30	37	7	4	13	315
No Longer High Priority	1	37	26	71	19	29	6	24	58	10	2	18	301
<b>Manure Storage</b>													
Liquid	0	2	10	4	10	3	0	3	2	0	0	3	37
Semi Solid	0	3	5	3	2	5	0	0	2	0	0	6	23
Dry	2	37	47	56	25	27	5	30	28	7	4	6	274
Gal/ Yr of Contaminated Runoff	<u>147,623</u>	<u>2,561,541</u>	<u>2,876,165</u>	<u>3,437,895</u>	<u>907,082</u>	<u>1,607,036</u>	<u>236,384</u>	<u>714,477</u>	<u>2,568,828</u>	<u>1,060,457</u>	<u>200,506</u>	<u>115,130</u>	<u>16,433,12</u>
<b>LIVESTOCK ACCESS (# of animals)</b>													
No Access	3,442	4,103	5,791	577	3,442	5,777	130	3,104	4,236	525	145	10	36,287
Limited	0	175	0	0	0	314	39	90	183	0	0	65	866
Unlimited	335	415	487	660	335	0	35	0	140	69	128	40	2,644
													146,950
<b>Length Of Fence</b>													
Required (Ft.)	12,953	23,424	20,229	33,710	12,953	10,510	1,320	1,650	5,280	7,326	14,305	4,290	
<b>Milkhouse Wash Water</b>													
Milkhouses	2	24	45	61	16	19	3	26	34	6	1	30	267
Parlours	0	0	1	0	5	1	0	2	0	0	0	0	9
No. With Treatment	0	0	12	5	9	6	2	6	13	0	0	9	62
No. to Water	2	24	34	56	12	14	1	20	21	6	1	21	205
Gal/ Year To Water	36,354	753,363	843,880	1,226,400	359,160	367,920	18,250	554,800	797,160	87,600	29,200	345,290	5,419,374

From: 1987 U.T.R.C.A. Beaches Strategy Summary Report

## Interim Township Summary of Estimated Value of Remedial Work on Total Phosphorus and Fecal Coliform Reductions

	Biddulph	Blanshard	Downie	East Zorra Tavistock	Ellice	Fullarton	Hibbert	Logan	North Easthope	South Easthope	Usborne	West Nissouri	Total
Manure Storage													
Total Remediation Cost*	40,200	709,200	799,800	976,500	260,800	457,600	70,000	235,200	632,400	255,500	51,200	35,700	4,524,100
Livestock Access- Est. Phosphorus Load (Kg/yr)	55	97	80	108	55	51	12	15	53	11	21	13	571
Fecal Coliform Input (#/153 Days)	6.8x10 <sup>12</sup>	1.2x10 <sup>13</sup>	9.9x10 <sup>12</sup>	1.3x10 <sup>13</sup>	6.8x10 <sup>12</sup>	1.5x10 <sup>12</sup>	6.4x10 <sup>12</sup>	1.8x10 <sup>12</sup>	6.6x10 <sup>12</sup>	1.4x10 <sup>10</sup>	2.6x10 <sup>12</sup>	2.1x10 <sup>12</sup>	7.1x10 <sup>13</sup>
Total Remediation Cost (\$1.50/ft.of Fence)	19,400	33,600	30,300	50,600	19,400	15,800	2,000	2,500	7,900	11,000	21,500	6,400	220,400
Value/\$1,000 Spent Tp Reduction (Kg/yr)	2.8	2.9	2.6	2.1	2.8	3.2	6.0	6.0	6.7	1.0	1.0	2.7	39.8
F.C Reduction (#/153 days)	3.5x10 <sup>11</sup>	3.6x10 <sup>11</sup>	3.3x10 <sup>11</sup>	2.6x10 <sup>11</sup>	3.5x10 <sup>11</sup>	4.1x10 <sup>11</sup>	7.5x10 <sup>11</sup>	7.2x10 <sup>11</sup>	8.4x10 <sup>11</sup>	1.3x10 <sup>11</sup>	1.2x10 <sup>11</sup>	3.3x10 <sup>11</sup>	5.0x10 <sup>12</sup>
MILKHOUSE WASHWATER													
Est. Phosphorus Load (Kg/yr)	70	840	1,190	1,960	420	490	35	700	735	210	35	735	7,420
Fecal Coliform Input (#/yr)	2.0x10 <sup>8</sup>	2.4x10 <sup>9</sup>	3.4x10 <sup>9</sup>	5.6x10 <sup>9</sup>	1.2x10 <sup>9</sup>	1.4x10 <sup>9</sup>	1.0x10 <sup>8</sup>	2.0x10 <sup>9</sup>	2.1x10 <sup>9</sup>	6.0x10 <sup>8</sup>	1.0x10 <sup>8</sup>	2.1x10 <sup>9</sup>	2.1x10 <sup>10</sup>
Total Remediation Cost (\$3,000/milkhouse)	6,000	72,000	102,000	168,000	36,000	42,000	3,000	60,000	63,000	18,000	3,000	63,000	636,000
Value/\$1,000 Spent TP Reduction(kg/yr)	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6
FC Reduction (#/yr)	92,000	92,000	92,000	92,000	92,000	92,000	92,000	92,000	92,000	92,000	92,000	92,000	11.600
Total Costs Of Identified Sources As Of 1987	65,600	814,800	932,100	1,195,100	316,200	515,400	75,000	297,700	703,300	284,500	75,700	105,100	5,314,500

\* For Explanation of Calculations, Refer to Section 3.4

From: 1987 U.T.R.C.A. Beaches Strategy Summary report

**APPENDIX 3:**  
**KINTORE CREEK WATERSHED STUDY UPDATE REPORT**

**KINTORE CREEK WATERSHED STUDY  
- 1987 PROGRESS REPORT -**

Prepared By: Craig Merkley

Rural Water  
Quality Specialist  
(March 1988)

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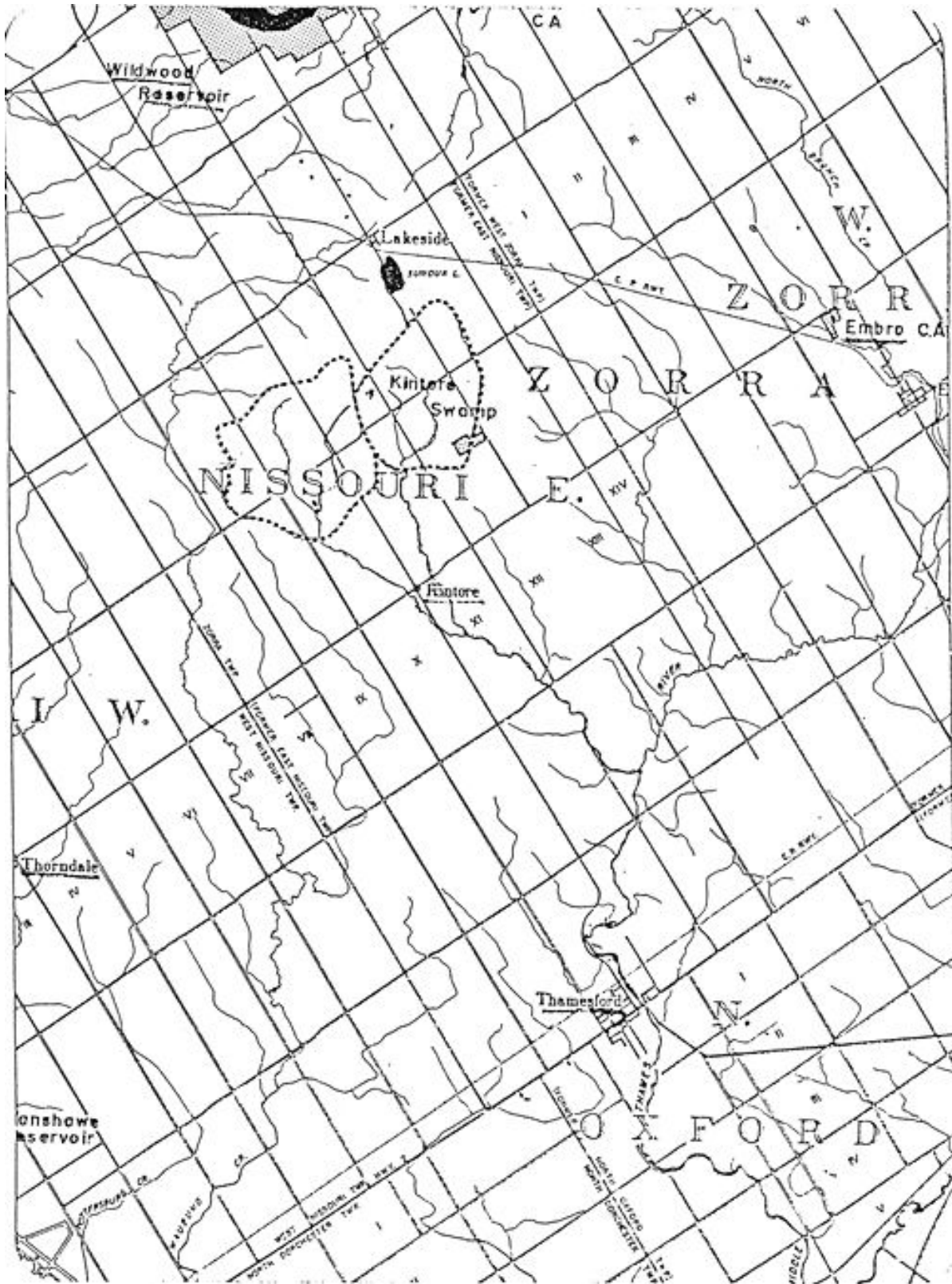
## 1. BACKGROUND

Kintore Creek originates near the village of Kintore in Zorra Township, Oxford County. It flows in a southerly direction for approximately 10 miles before outletting into the middle branch of the Thames River near Thamesford (fig. 1).

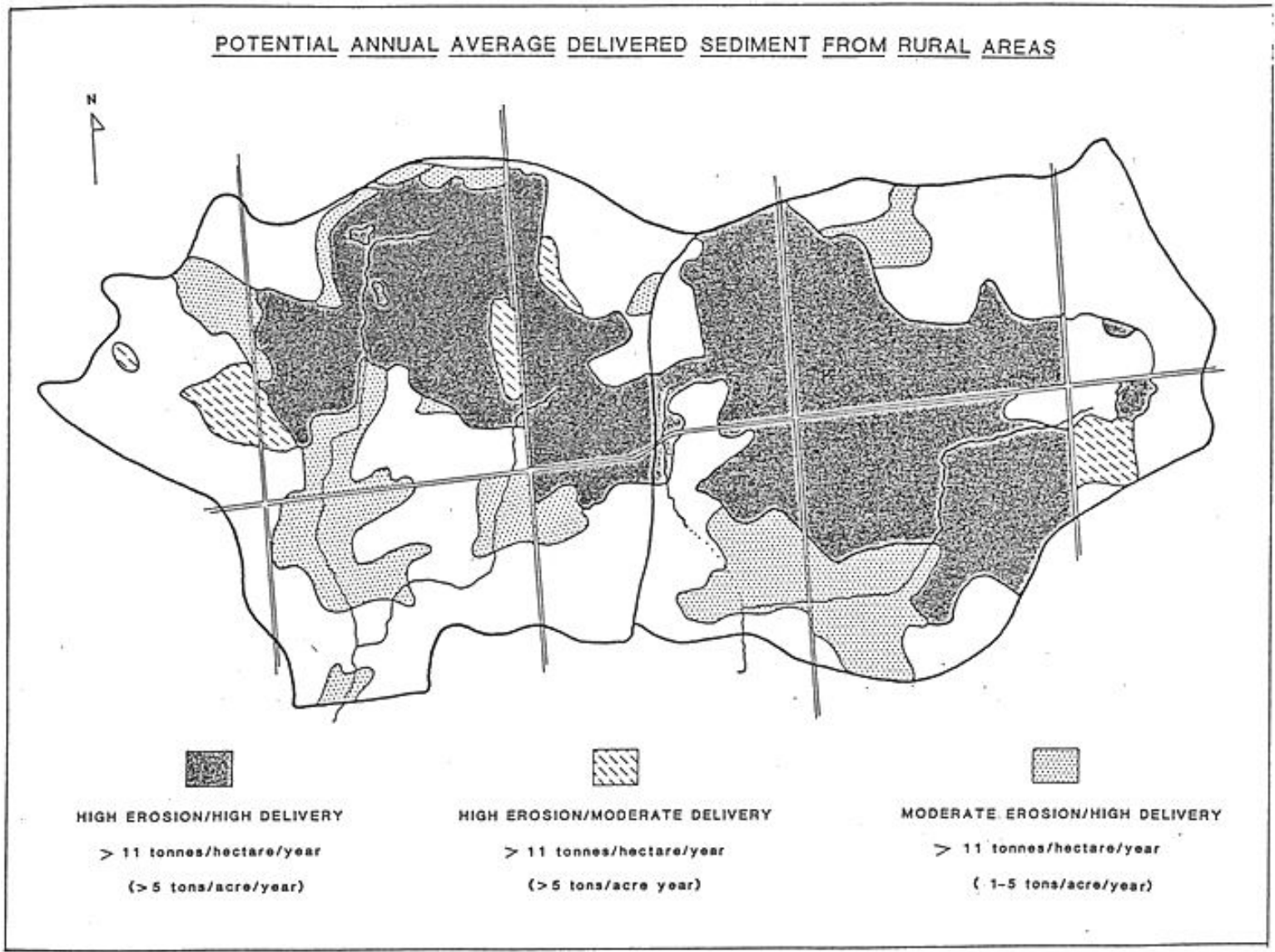
The headwaters of the creek are located in two adjacent subbasins. The western subbasin is drained by the Vannatter municipal drain, while the eastern subbasin is drained by the Logan municipal drain. The drains converge to form the Kintore creek just south of Kintore.

Each of these paired subwatersheds are approximately 1,500 acres in size. They are characterized by long sloping fields with erodible soils. Environment Canada sediment delivery maps have classified 45% of the watersheds as high potential for erosion and delivery of that erosion to a watercourse (fig. 2).

Agriculture is the primary landuse in each subbasin. There are 15 landowners in the western basin and 13 in the eastern basin. There are an equal number of both cash crop and livestock operations in each watershed. The farm sizes range from 300 acres to 40 acres.



**Figure 1:** Location of Kintore Creek Paired Watersheds



**Figure 2:** Erosion/Delivery Map of Paired Watersheds

## **2. OBJECTIVES**

The primary objective of the watershed study are to quantify the effect conservation practices have on erosion and downstream water quality.

To accomplish the objective, the western subbasin was selected for "demonstration" purposes, the eastern subbasin is left as a "control". Conservation tillage and cropping, are promoted in the demonstration basin, no such promotion is planned for the control.

The water quality of each subbasin has been continuously monitored. Samples are analysed to determine existing phosphorus and suspended solid levels. As a result, four years of data have been collected and tabulated. The existing conditions in each subwatershed are well documented.

With the background data base established, the effect future conservation practices has on water quality can be measured.

## **3. 1984 TO 1986 PROGRAM SUMMARY**

### **3.1 Water Quality Monitoring Program**

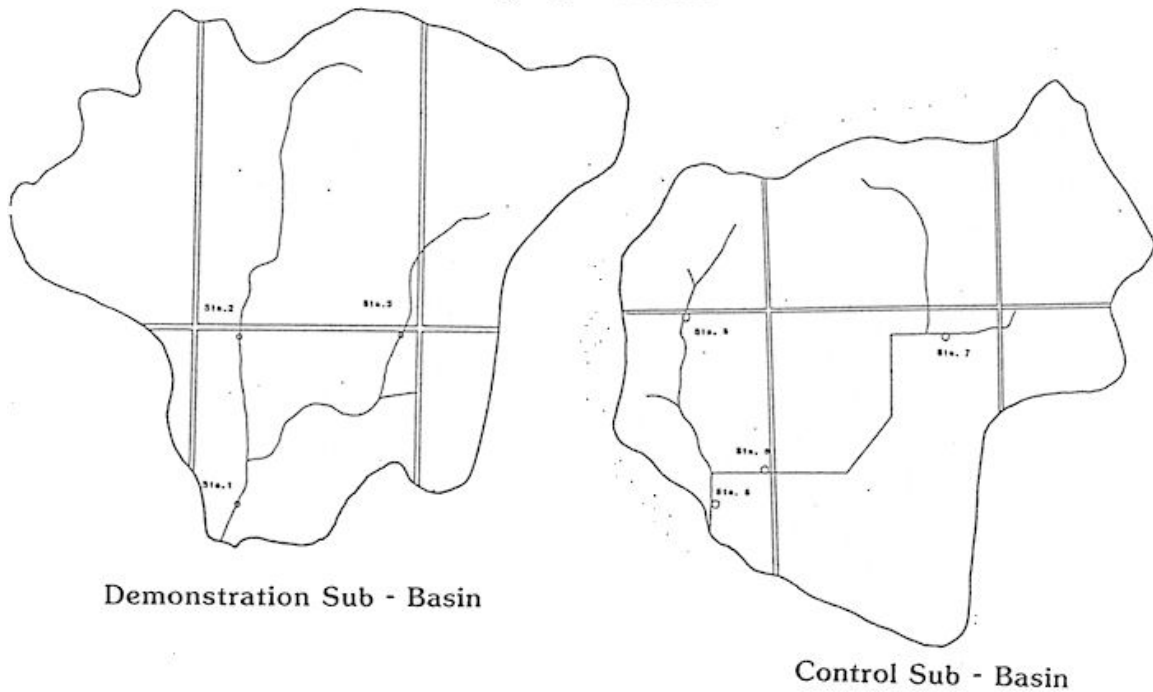
To help determine the existing water quality condition in the two subbasins, a water monitoring program was established. Seven sampling stations were selected (fig. 3). Three are located in the western basin, -four are located in the eastern basin. To determine loadings, stage discharge curves were developed at each of these seven stations. Base level recorders were installed at the two outlets. To monitor storm events, ISCO automatic samples were also installed at the outlets. The water quality data has been tabulated and entered on computer for storage and future analysis.

### **3.2 Landowner Liaison**

Staff have worked closely with landowners in the demonstration basin. Individual farm plans have been developed for each. These plans help landowners identify and correct erosion problems on the farm.

## KINTORE CREEK WATERSHED

### Sampling Locations



**Fig. 3:** Sampling Locations

The universal soil loss equation was used to calculate existing erosion rates on a field by field basis (fig. 4). Landowners were shown how certain conservation practices could help reduce these erosion rates to a tolerable level.

Individual recommendations included:

- a) tillage and cropping practices
- b) medial measures
- c) drainage improvements
- d) livestock related controls
- e) fishery potential
- f) wind erosion control

Landowners were informed of the financial and technical assistance available to them. A number of farmers in the demonstration basin have acted upon the recommendations made in their farm plans.

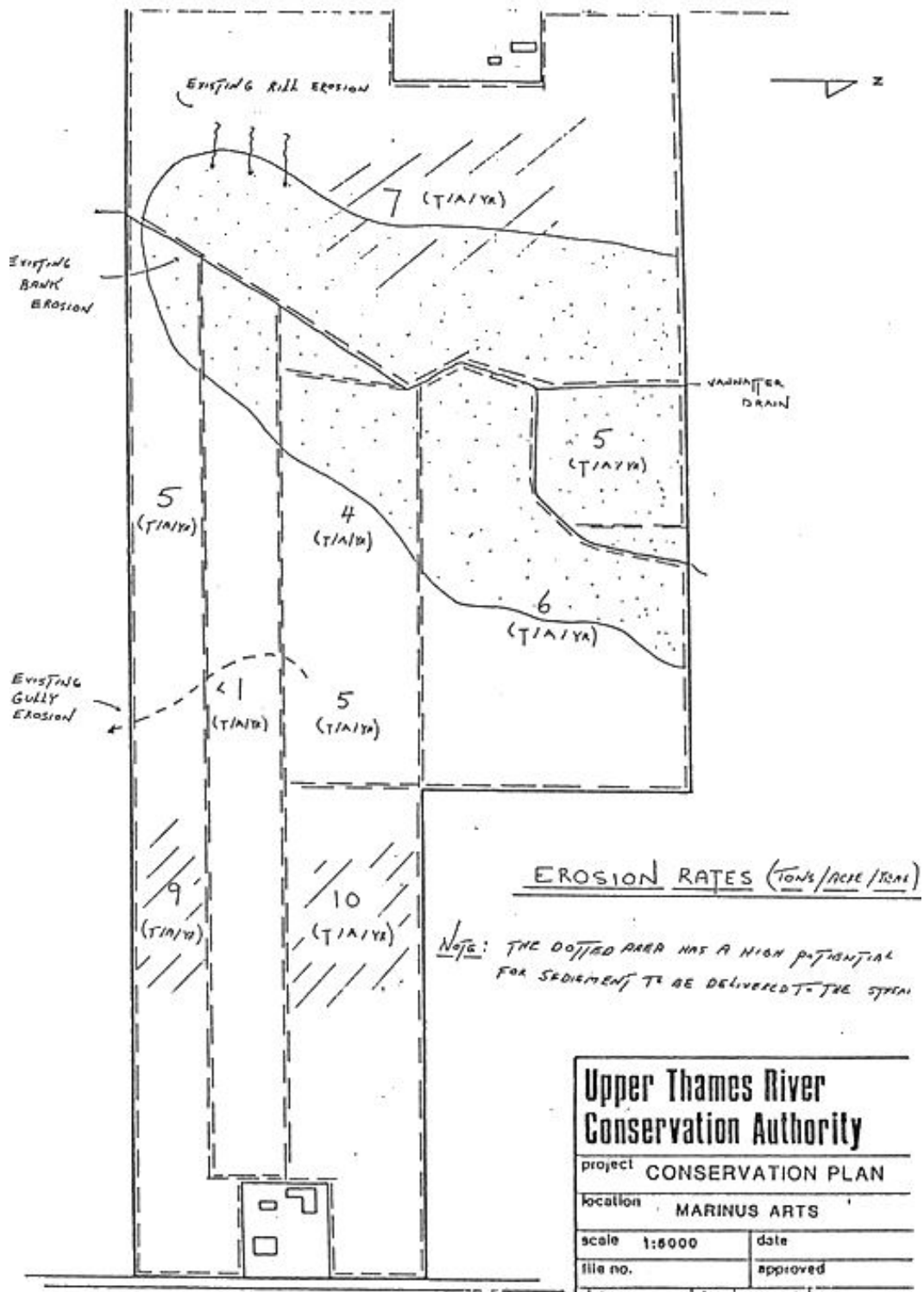


Figure 4: From Farm Plan of Marinus Arts, Erosion Rates on a Kintore Farm.

### 3.3 Structural Measures

To date, a total of 11 water and sediment control basins (WASCOBs) have been constructed in the demonstration basin. One waterway diversion has also been constructed. The WASCOBs are designed to control gully erosion. They pond runoff water during a storm event, then drain it slowly away to a safe outlet through an underground tile system.

Although these structures do not reduce sheet erosion, they have helped farmers identify the sheet erosion problem. After severe storm events, deposition in the ponding areas can be quite noticeable (fig. 5). Farmers have seen this occurring and now recognize the additional sheet erosion problem. The structures have served as an educational tool, most farmers realize structures are only part of the solution to upland erosion.



**Fig. 5:** Structures help prevent gully erosion, but do not control upland sheet erosion.

### 3.4 Summary

Landowners in the demonstration watershed are at the stage where widespread adoption of conservation practices are possible. The success of the study depends on this component of the program. With financial assistance from the Ministry of the Environment and technical support from the local Joint Soil and Water Conservation Program, the study is in a position to successfully implement the final stage of the program - conservation tillage and cropping.

## 4. 1987 WORK PROGRAM

### 4.1 Landowner Liaison

As previously mentioned, landowners cooperation is an essential component of the watershed study. On June 17, 1987, a meeting was held with the landowners in the demonstration watershed to determine their commitment to the study. During the meeting several concerns were expressed with regards to the program. These concerns included:

- a) yield reduction
- b) potential reimbursement methods
- c) examination of fertilizer practices
- d) program delivery
- e) degree of farmer control

It was resolved that each landowner be given the chance to reconsider the program before further commitment was made. A poll was then to be conducted to determine group interest level. The poll was conducted one week after the meeting, unanimous approval for the project to continue. The results of the poll are summarized in fig. 6.

A second meeting was held in December to review the tillage season and introduce the Land Stewardship Program (LSP). The LSP is intended to promote the adoption of conservation practices by offering grants incentives. The program complemented the efforts of the Kintore Study, landowners were encouraged to apply.

In individual meetings help during the winter, staff helped the landowner fill out the LSP forms and complete the required three year action plan. Only one farmer was uninterested in the applying to the program. The action plans submitted by each farmer as part of the application, indicated that during the next two years, conservation tillage will be adopted on 80% of the tillable land in the demonstration basin.

KINTORE: PROPOSAL QUESTIONNAIRE

NAME: RESULTS. LOT/CONC.#           

1. Would you be willing to participate in the proposed Demonstration Control watersheds project, if adequate funding can be obtained?

Yes  9 No  0

If Yes, please answer the following questions.....

3 expressed interest over phone - not survey yet.

1 rental situation unclear at moment..

13 TOTAL.

2. What crops do you usually grow?

		Approx. Acreage
corn	<input checked="" type="checkbox"/>	_____
soybeans	<input checked="" type="checkbox"/>	_____
white beans	<input checked="" type="checkbox"/>	_____
cereal	<input checked="" type="checkbox"/>	_____
pasture	<input checked="" type="checkbox"/>	_____
other	_____	_____

3. Do you practice a standard rotation?

Yes  8 No  1

If Yes, outline your rotation:

4. What is your present tillage practice on each crop?

— timing — machine type — # passes

corn: Primary-  
Secondary-  
soybeans: P-  
S-  
white beans: P-  
S-  
cereal P-  
S-  
other P-  
S-

Figure 6: Results of Kintore Poll

## 4.2 Water Quality Monitoring

Between September 1, 1987 and March 31, 1988, 133 samples were collected at the seven stations. Of these, 63 were event related. The samples were collected with a USPH - 48 depth integrated sampler. The events were sampled at the outlets by ISCO 2100 series automatic samplers.

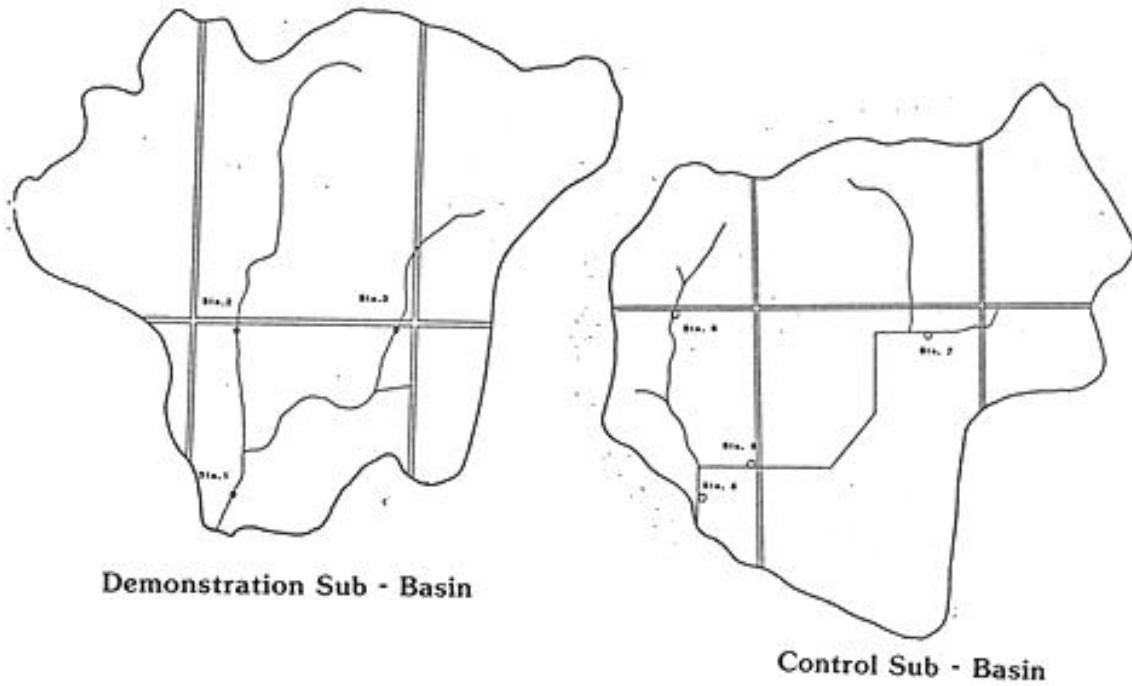
The water levels at the outlets were monitored by A-71 Stevens recorders. The charts from these recorders are digitized so hourly flows can be computed at each outlet. Stage discharge curves are maintained at each of the seven stations, the flows are gauged with a Pymy-Price current meter. A Bats unit has been installed at station 6. The unit has helped assure runoff events are not missed. Staff can keep accurate account of the runoff event from the office. The unit has also helped determine the different characteristics of the two drains. The Logan drain responds more quickly to an event than the Vannatter (Fig. 8). The drains are sampled accordingly.



**Fig 7:** A current meter is used to calculate stream velocity in low flow conditions.

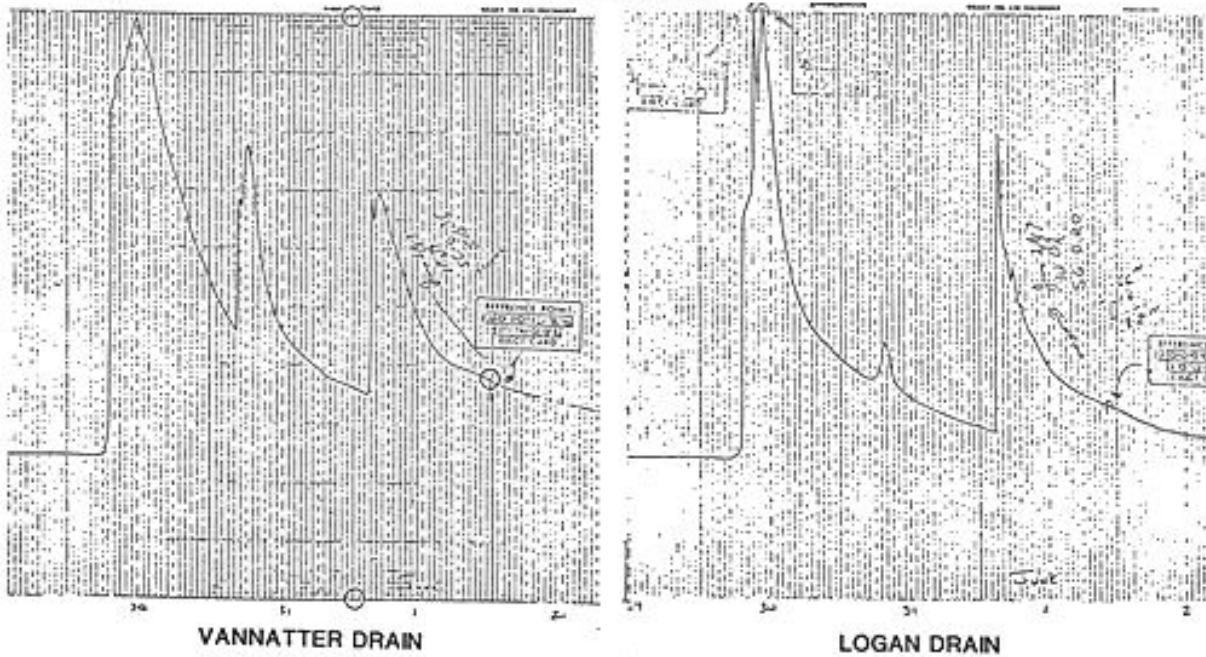
# KINTORE CREEK WATERSHED

## Sampling Locations



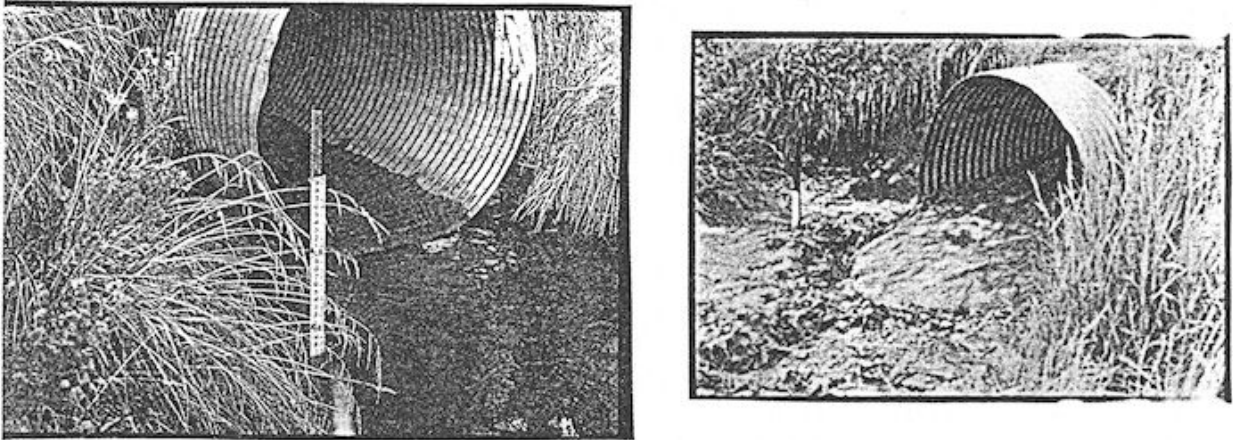
## STORM EVENT HYDROGRAPH

MAY 30, 1987

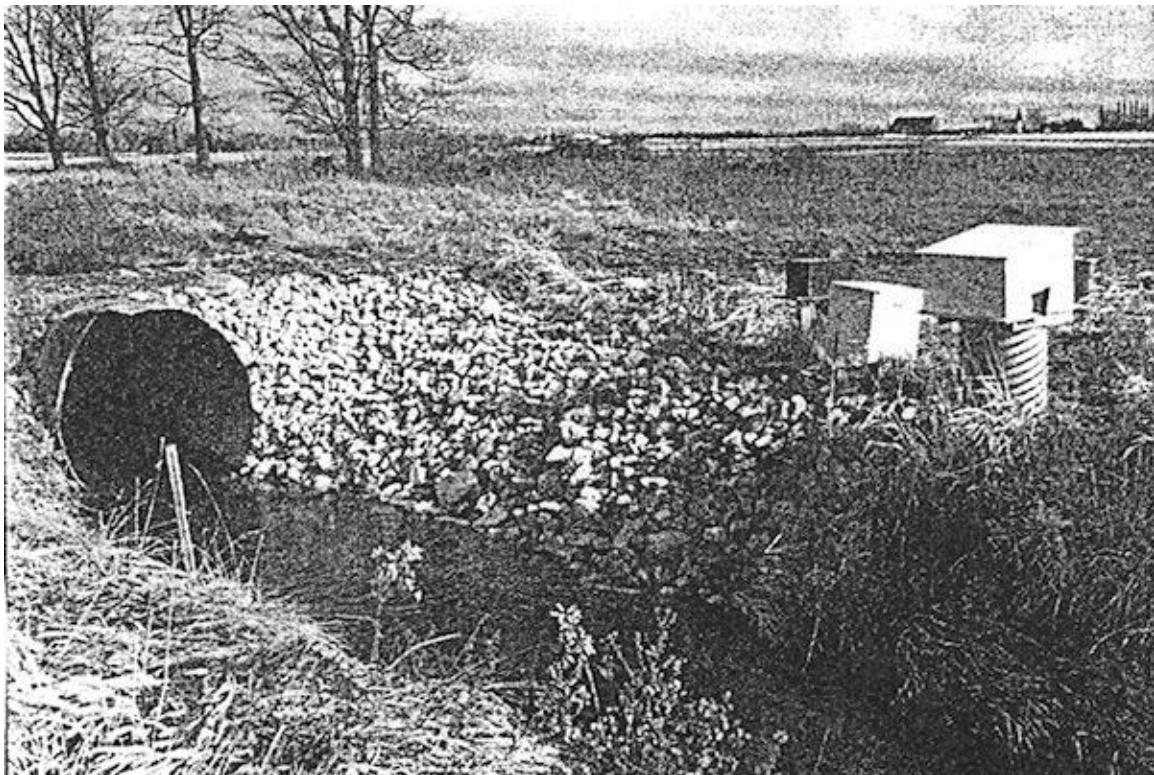


**Figure 8:** The Logan Drain responds more quickly to runoff events.

Streambank revetment was completed at the outlet to the demonstration basin (fig. 10). Ten meters of rip rap and filter cloth material were required to stabilize the bank and protect the monitoring equipment. Repairs were also made to the access laneways to the two outlet stations. The repairs were necessary to assure samples were collected during runoff events.



**Fig. 9:** Low flow and high flow conditions at Station 2.



**Fig 10:** Repair to the stream bank at Station 1

### 4.3 Structural Measures

Two structural projects were completed during the fall of 1987. A water and sediment control basin (fig. 11), and grassed waterway/diversion. Both were completed on J. McMurray property. Two projects are still planned in the demonstration subbasin. One could be completed during the spring of 1988. The other conflicts with the Ontario Drainage Act. The landowner must work in accordance with the Act if the work is to be completed.



**Fig. 11:** WASCOB Construction on the McMurray Property.

#### 4.4 Tillage Program

A long dry fall provided ideal conditions for conservation tillage.

321 acres were mulch tilled. An additional 69 acres will be mulch tilled during the spring. The acreage represents over  $\frac{1}{3}$  of the row crop acreage in the demonstration basin (fig. 13). As figure 14 indicates, 10 of the 15 landowners used the soil saver during the fall. Of the 5 that did not, 3 had land in the watershed that was seeded down, 1 farm was sold and the last farmer had improper soil conditions.

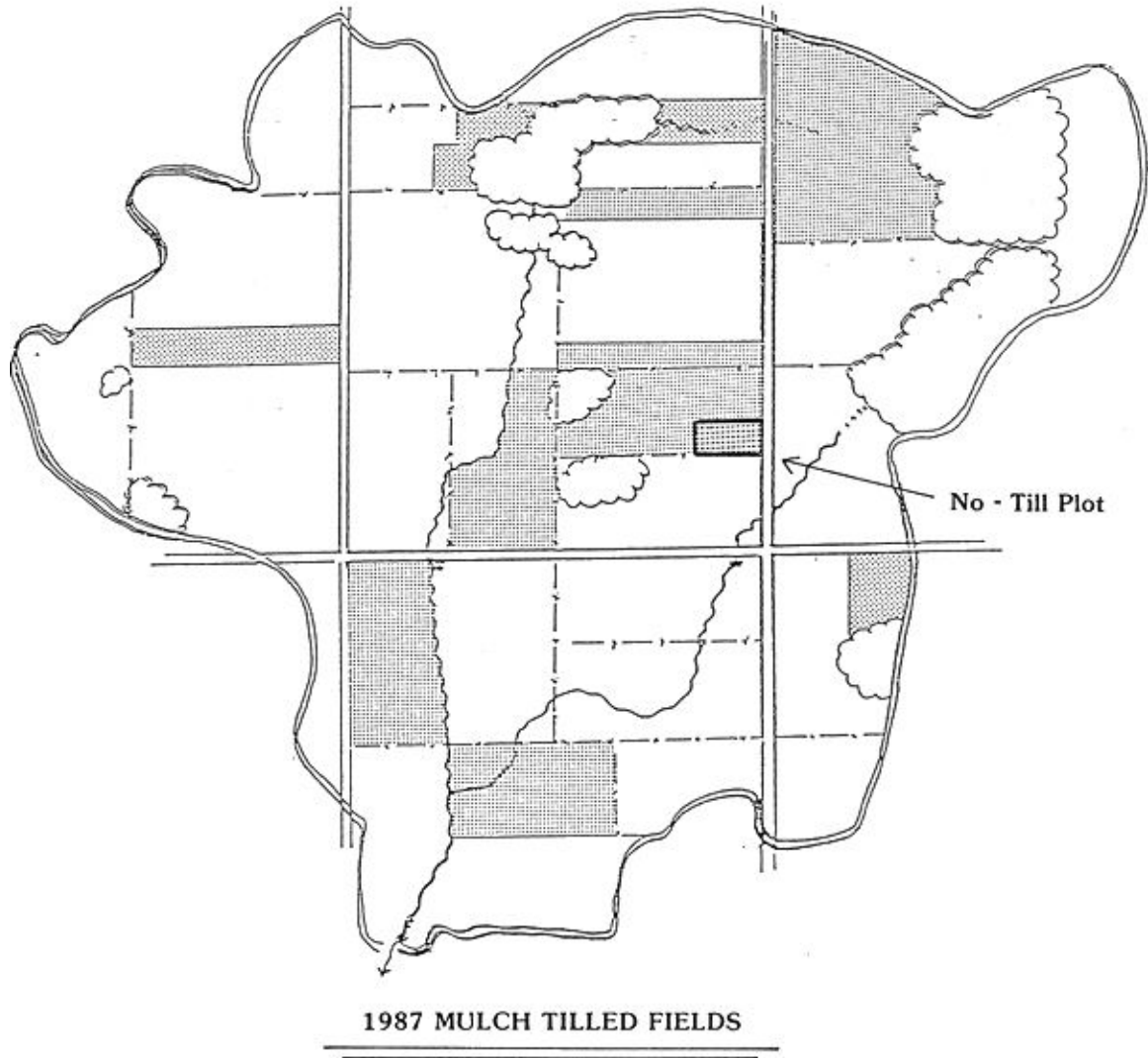
A Glencoe 7-shank Soil Saver was used in the subbasin. The machine was supplied by the local JSWCP as part of their commitment to the study. A John Deere mulch finisher has been acquired from the JSWCP. This machine is designed for single pass seed bed preparation on mulch tilled land.



**Fig. 12:** Corn ground should be mulch tilled on a 30° angle to the rows.

# KINTORE CREEK WATERSHED

— DEMONSTRATION BASIN —



**Figure 13:** Fall 1987 Mulch Tillage Map

**Figure 14:** 1987 Cropping and Tillage Demonstration Basin

Landowner	Tillable Acres	'87 Crop	'87 Crop Acreage	'88 Crop	'88 Crop Acreage	'87 Acres in Conservation Tillage	'88 Planned Acreage in Conservation Tillage	'88 Forage Crop	% Acreage in CT & Forage
Arts	120	Corn	120	Corn	87	34	60	10	60+10=70 (58%)
		Grain		23					
		Alfalfa		10					
Vanstrien	245	Corn	175	Corn	175	10	74	0	74(30%)
		Grain	35	Grain	35				
		Wt. Beans	35	Wt. Beans	35				
Brekeimans	137	Corn	136	Corn	136	40	89	0	89(65%)
Pelkmans	93	Corn	41	Corn	60	30	60	19	60+19=79 (85%)
		Grain	14	Grain	14				
		Alfalfa	38	Alfalfa	19				
McMurray	88	Corn	47	Corn	28	71	68	15	58+15=83 (94%)
		Grain		25					
		Soybean	41	Soybeans	20				
Deslippe	82	Corn	33	Corn	13	4	13	49	13+49=62 (75%)
		Grain	0	Grain	20				
		Alfalfa	79	Alfalfa	49				
Henderson/ Rounds	80	Corn	80	Corn	20	'80	20+	0	20(25%)
				Soybeans	60				
Ball	58	Corn	42	Corn	40	15	40	18	40-118=58 (100%)
		Alfalfa	16	Alfalfa	18				

**Figure 14:** 1987 Cropping and Tillage Demonstration Basin - continued

Landowner	Tillable Acres	'87 Crop	'87 Acreage	'88 Crop	'87 Acreage	Acres in Conservation Tillage	'88 Planned Acreage in Conservation Tillage	'88 Forage Crop	% Acreage in CT & Forage
Van Maar	50	Corn	28	Corn	28	0	0	22	22 (44%)
		Alfalfa	22	Alfalfa	22				
Pearson	48	Corn	48	Soybeans	48	20	48	0	48 (100%)
Kew*	42	Corn	42	Corn	22	0	0	10	10 (23%)
				Soybean	10				
				Alfalfa	10				
McLarnon	41	Corn	11	Corn	11	17	11	30	11+30=42 (100%)
		Grain	10	Alfalfa	30				
		Alfalfa	20						
Davis	40	Corn	25	Alfalfa	40	0	0	40	40 (100%)
		Grain	5						
		Alfalfa	10						
McKay	30	Grain	30	Corn	30	0	?	0	0
Arther	17	Corn	10	Alfalfa	17	0	0	17	17 (100%)
		Alfalfa	7						
Totals:	1171					321	483	230	61% **

\* Soil type on farm unsuitable for conservation tillage

\*\* 61% is calculated from totals for 1988, divided by Total Tillage Acreage

Several modifications to equipment are planned for the 1988 tillage and planting season. The mulch finisher will be fitted with a set of Salford Farm Equipment rolling baskets. The baskets will replace the existing finishing harrows. These baskets allow for better trash flow and finer seed bed preparation.

Some planter modifications are also planned for the spring. To assist those who feel their planter will not work properly in heavy trash, a set of custom made trash wipers have been purchased. These trash wipers were developed by a local farmer who has had many years experience with reduced tillage systems.

The planter modifications could help ease some landowners towards a no-till system. A 5 acre no-till plot will be established in the demonstration basin this spring (fig. 12). The plot will serve as an excellent demonstration site for these interested farmers. The plot will be monitored by the JSWCP as part of their side by side demonstration program. JSCWP staff will be accessible to other landowners. The watershed if agronomic assistance is required.

## **5. 1988 WORK PROGRAM**

Highlights from the 1988 work plan includes:

- a) coordinate and supervision of spring tillage equipment
- b) assist with planter modifications
- c) supervision of planting
- d) crop monitoring
- e) completion of structural measures
- f) field tours
- g) crop yields
- h) continue water monitoring program
- i) maintain monitoring equipment
- j) maintain computer data base
- k) report preparation
- l) assist pesticide study

With financial assistance from Ministry of the Environment and support from the local JSWCP, staff and landowners in the watershed look forward to a successful year.



**Figure 15:** Students From the University of Guelph Tour the Demonstration Basin.