

CLASSIFICATION OF ISABELLE CREEK
PIERCE COUNTY
LOWER CHIPPEWA RIVER BASIN
(ELLSWORTH POTW)

Report Date: March, 1989

By Paul LaLiberte

Isabelle Creek originates in a series of normally dry drainage-ways in Ellsworth, Wisconsin. Stream gradient is quite steep in Ellsworth, moderate for the next three miles, and then steep again. The origin of natural stream flow is in the second high gradient area just upstream from Hwy V. Above this area, continuous flow is maintained by two wastewater discharges. The Ellsworth Co-op Creamery discharges cooling water which intermittently joins the POTW discharge downstream or seeps to groundwater. The POTW maintains continuous flow down to the natural springs at Hwy V, although some loss to groundwater can occur. On 8-26-82, when 0.37 cfs of combined effluent was discharged, a flow of 1 cfs was measured at Hwy V.

Land use is urban in Ellsworth and the stream receives street debris during storm events as well as spills of waste oil and antifreeze. From Ellsworth to Hwy V, land use is a combination of agricultural (cropland-pasture) and forest. Upland and stream bank erosion are extensive in the agricultural areas. Cropping occurs immediately adjacent to the stream bank and cattle have unlimited access to the stream.

Aquatic habitat rating (Ball) of Isabelle Creek in the forested areas was fair (156-166 on a scale of 56-230) with sedimentation and low flow as the main limiting factors. Habitat rating in the agriculture areas was poor (203 on a scale of 56-230) with erosion and stream bank failure, as well as sedimentation and low flow, limiting habitat. Stream substrate varied from a moderate amount of rock (rubble/gravel) in the upstream reaches, to primarily sand and silt in the middle, low gradient areas, and to rock again (bedrock/rubble/gravel) near Hwy V and below.

The headwaters of Isabelle Creek were previously classified by Water Resources Management as capable of supporting marginal fish and aquatic life above the town road two miles south of Hwy 10/63, and intermediate fish and aquatic life from this point to Hwy V. The classification was full fish and aquatic life from Hwy V downstream. About .75 miles below Hwy V Fish Management has classified Isabelle Creek as class II - brown trout.

A post-operative point source impact study of the creek (Ziminske) documented that DO and ammonia standards were met in all places but CS14 (see map) in the summer. This may be attributable to periodic WPDES permit exceedances at the two upstream dischargers. Aggressive WPDES permit enforcement is needed to address this issue. Macroinvertebrate samples generally support the current use classification, demonstrating increasing diversity downstream and a shift from tolerant to intolerant insects. The stream is capable of supporting a biotic index (Hilsenhoff) rating of "very good" water quality at Hwy V, when the discharges are operating properly.

Electrofishing was conducted between the creamery and POTW, near CS13, near Hwy V, and in the class II trout reach. Above the POTW no fish were found. From the POTW to Hwy V tolerant forage fish were present, with fathead minnow and stickleback common and white sucker present. In the trout water, intolerant forage fish, longnose and blacknose dace were common. No trout were found in the short stream segment sampled.

The physical and biological data collected since the original stream classification in 1975 support continuation of the same aquatic use classification. It should remain "marginal" use class above CS14, "intermediate" use class between CS14 and Hwy V, and full fish and aquatic life below Hwy V. Water quality standards associated with cold water fisheries should apply below Hwy V.

Although current water quality falls short of meeting the standards associated with this classification, aggressive enforcement of existing WPDES permit limits should improve the situation.

Enc.

Ball, J. 1982. Stream classification guidelines for Wisconsin. Draft DNR technical bulletin.

Hilsenhoff, W. 1987. An improved biotic index of organic stream pollution. Great Lakes Entomologist 20(1): p. 31-36

Ziminske, M. 1989. Postoperative water quality point source evaluation of Isabelle Creek. Pierce Co., WI DNR-Eau Claire.

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CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN *file*

Date: October 27, 1988
To: Ellsworth POTW Facility File

File Ref: 3200

From: Paul LaLiberte *P.L.*

Subject: Inspection of Receiving Stream

On 4-13-88, I accompanied the area engineer, Joan Ross, on an inspection of Isabelle Creek. The Ellsworth POTW had been performing poorly since January, and complaints had been received about the appearance of the creek. For its first three miles, the creek consists of 100% effluent from the Ellsworth Co-op Creamery cooling water and the POTW. On the day of the inspection, the cooling water disappeared before reaching the POTW outfall. The stream was continuously flowing at all points below the POTW. Sludge was deposited on the stream bed near Highway C. Very dense periphyton and phytoplankton were present downstream to Highway V where the stream became visibly cleaner. Springs are known to augment flow just upstream from Highway V.

Chironomid larvae were abundant at Highway C and the first town road. No aquatic macroinvertebrates of any kind could be found at the second and third town roads. A macroinvertebrate sample was collected near Highway V. The Hilsenhoff biotic index of this sample was 4.0. A sample collected at the same location in 1982 was 5.4. While severe degradation of water quality was indicated by the lack of aquatic life in the middle reaches, no departure from usual water quality at Highway V occurred as indicated by the biotic index data.

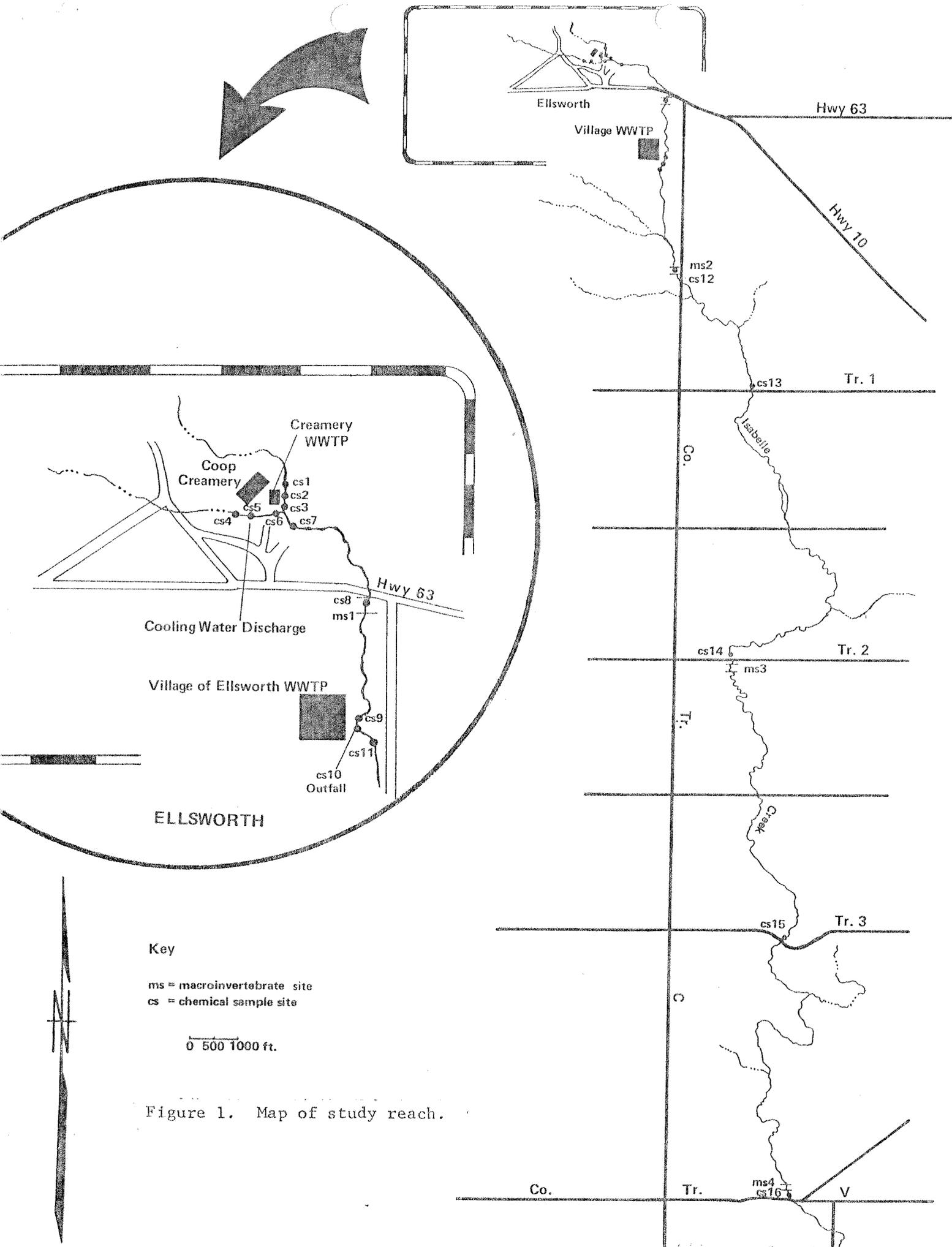
All measured dissolved oxygen levels were well over saturation (see tables) and could be indicative of significant diel DO deficit during nighttime hours. The excessive algal growth was evident in the high day time pH and oxygen levels and downstream increase in suspended solids. BOD₅ decay apparently was occurring and, in conjunction with the observed sludge beds and nighttime algal respiration, may have caused the anaerobic conditions necessary to explain the total lack of aquatic life in the middle stream reaches. The stream and effluent un-ionized ammonia levels were all above 0.04mg/l, the chronic water quality criterion for warm water fish and aquatic life.

This data does not support the statement made by Joan Ross in her letter to the village on 4-19-88. The POTW did indeed do significant environmental damage as documented both biologically and chemically. Fortunately, the adverse affects of the POTW did not extend downstream to Highway V, where the trout stream classification begins. A more detailed review of the impact of the Ellsworth POTW will be included in a post-operative point source impact study report due in the next year.

Attachments

c: Duane Schuettpelz - WR/2
John Paddock

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Key

- ms = macroinvertebrate site
- cs = chemical sample site

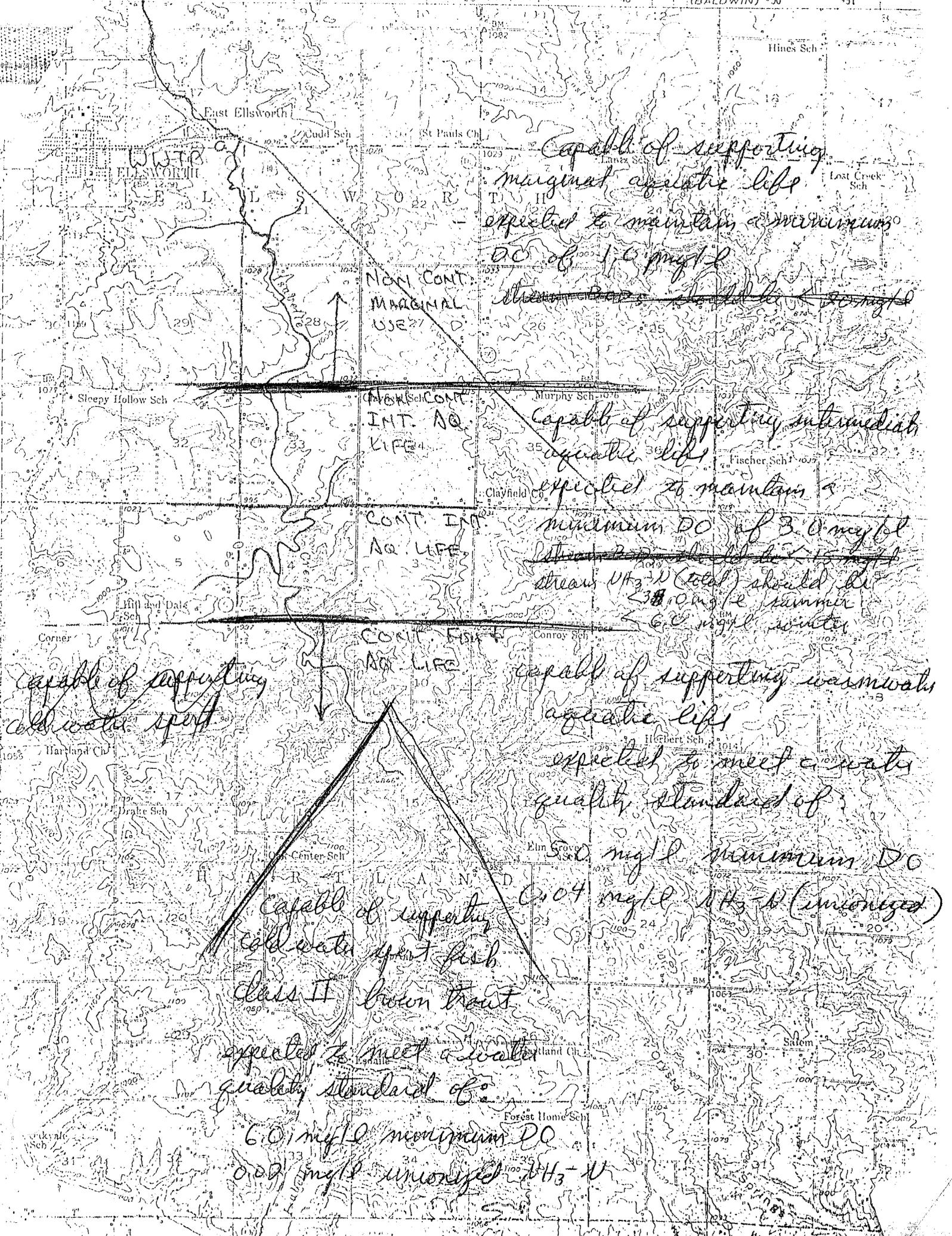
0 500 1000 ft.

Figure 1. Map of study reach.

4-13-88 Water Quality Data (in mg/l unless otherwise noted)

<u>Site</u>	<u>(°C)</u> <u>Temp</u>	<u>DO</u>	<u>(% Sat)</u> <u>DO</u>	<u>BOD₅</u>	<u>Suspended</u> <u>Solids</u>	<u>Cl</u>	<u>Tot.</u> <u>Phos</u>	<u>Tot.</u> <u>Nitro</u>	<u>Un-ionized</u> <u>NH₃-N</u>	<u>pH(su)</u>	<u>Time</u>
POTW				>23	10	230	13.6	18.2	0.069	7.6	15:15
Hwy C	14	20	192	11	13	170	11	10.4	0.072	8.4	13:10
1st Twn Rd	11	18.8	169								13:20
2nd Twn Rd	11	>20	>180								13:35
Tractor Bridge	11	14.4	130	7.1	24	180	4.25	7.4	0.051	9.1	14:35
3rd Twn Rd	11	17.4	157								13:50
Hwy V	10.5	17.8	159								14:55

WR/PL100.sz



Capable of supporting marginal aquatic life expected to maintain a minimum DO of 1.0 mg/l

NON CONT. MARGINAL USE

Capable of supporting intermediate aquatic life expected to maintain a minimum DO of 3.0 mg/l stream $\text{NH}_3\text{-N}$ (total) should be 2.0 mg/l summer & 6.0 mg/l winter

NON CONT. INT. AQ. LIFE

CONT. INT. AQ. LIFE

CONT. FISH AQ. LIFE

Capable of supporting warmwater aquatic life expected to meet a water quality standard of 6.0 mg/l minimum DO & 0.4 mg/l $\text{NH}_3\text{-N}$ (un-ionized)

Capable of supporting cold water sport fish class II brown trout expected to meet a water quality standard of 6.0 mg/l minimum DO & 0.02 mg/l un-ionized $\text{NH}_3\text{-N}$

Capable of supporting cold water sport

Ball

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

DATE: November 9, 1988 FILE REF: 3200
TO: Paul LaLiberte - WD, Eau Claire
FROM: Duane Schuettpelz - WR/2
SUBJECT: Investigation of Isabelle Creek Near the Village of Ellsworth

We have reviewed your description of the condition of Isabelle Creek on April 13, 1988. We have also reviewed the wastewater files and facility contact forms. From the information available it appears the plant was being poorly managed resulting in the stream conditions you found. It also appears possible that unpermitted discharges of wastewater from the Ellsworth Dairy may have contributed to the poor stream conditions.

If management of both facilities have improved, the stream may have had time to show signs of improvement although the low flows this summer could have slowed any potential recovery. We suggest doing an additional study in the near future to determine if stream conditions have improved as might be expected. If not, we suggest a more detailed investigation of both facilities to determine if the effluent limitations contained in their respective permits are correct and are being met.

If you would like to discuss this situation, please call Joe Ball.

DHS:JB:jms/S0201-22
cc: Joan Ross - WD, Eau Claire
Charles Burney - WW/2

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: October 27, 1988
To: Ellsworth POTW Facility File

File Ref: 3200

From: Paul LaLiberte *PL*

Subject: Inspection of Receiving Stream

Tom/Jo
What does
his mean
Joan

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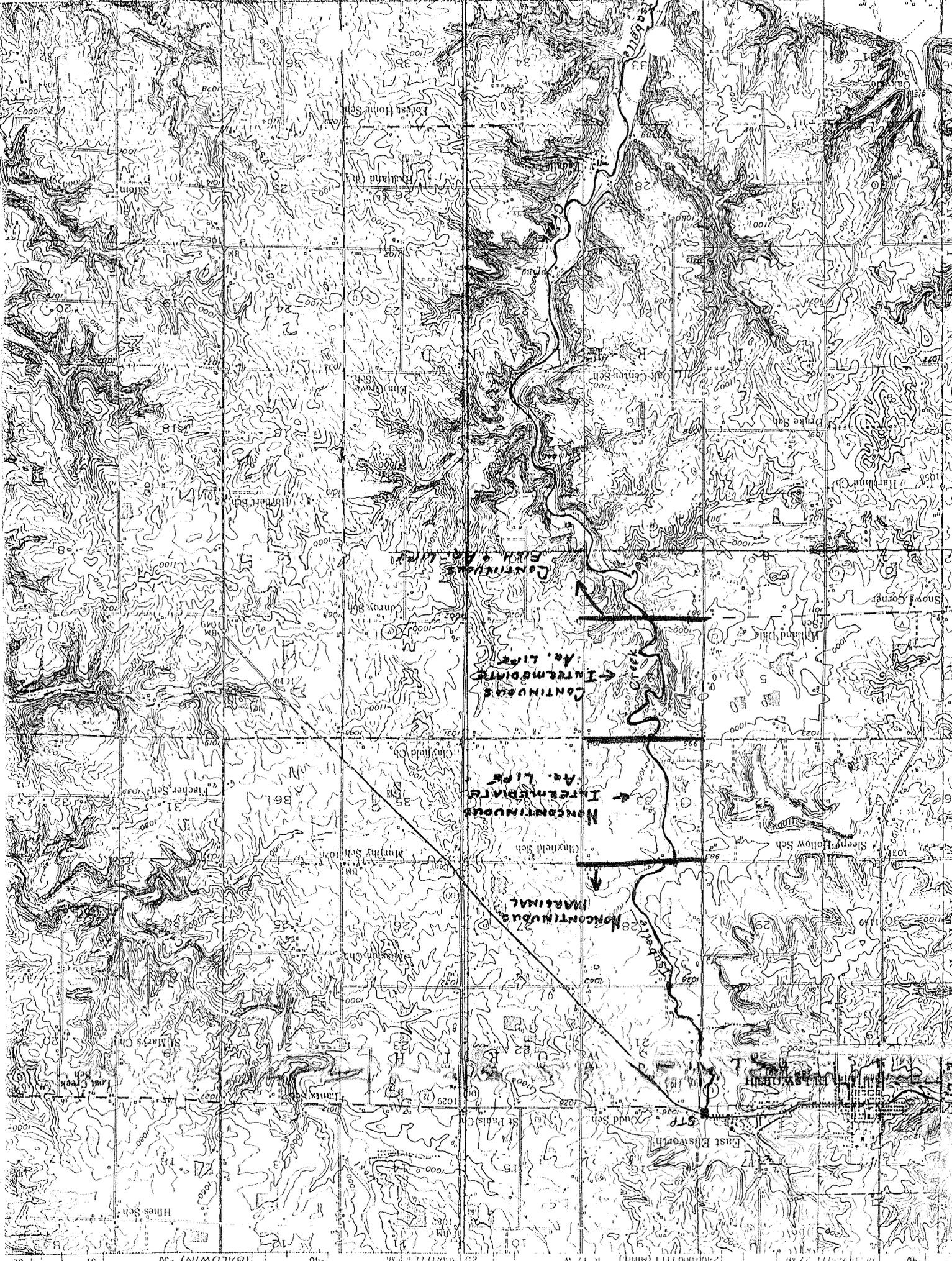
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John Paddock

WR6/PL005.plm



CONTINUOUS
INTERMEDIATE
NONCONTINUOUS
MARGINAL

← INTERMEDIATE
A. LINE

← INTERMEDIATE
A. LINE

NONCONTINUOUS
MARGINAL

ELLSWORTH, PIERCE COUNTY

Wastewater Receiving Stream Classification

Effluent from the Ellsworth WWTP is discharged to Isabelle Creek about two miles downstream from the stream's headwater. One-half mile upstream from the WWTP treated wastewater and cooling water is discharged by the Ellsworth Co-op Creamery. During dry weather conditions stream flow in the absence of the three discharges would be zero.

Downstream from the WWTP, through sections 20, 21, 28, and into section 33 (about three miles of stream flow), adjacent land is rather flat and use is agricultural with intense pasturing along the stream bank. Stream banks are eroded, vegetative cover is short and close cropped and the stream is relatively shallow, wide and turbid.

Through the remainder of section 33, and along section 4, the stream banks are steep and high disallowing access and use. Somewhere in the north half of section 4, spring flow augments sewage flow so that at CTH "V" Isabelle Creek is a continuous flow stream.

Downstream from CTH "V", farming is practiced on a rather narrow flat flood plain. Beyond the flat area steep hills preclude cultural land use. A class III trout fishing is documented beginning one mile below CTH "V".

Photos on last page

Isabelle Creek at town road
section 28/33 below WWTP
looking south

Isabelle Creek at CTH "V"
looking south

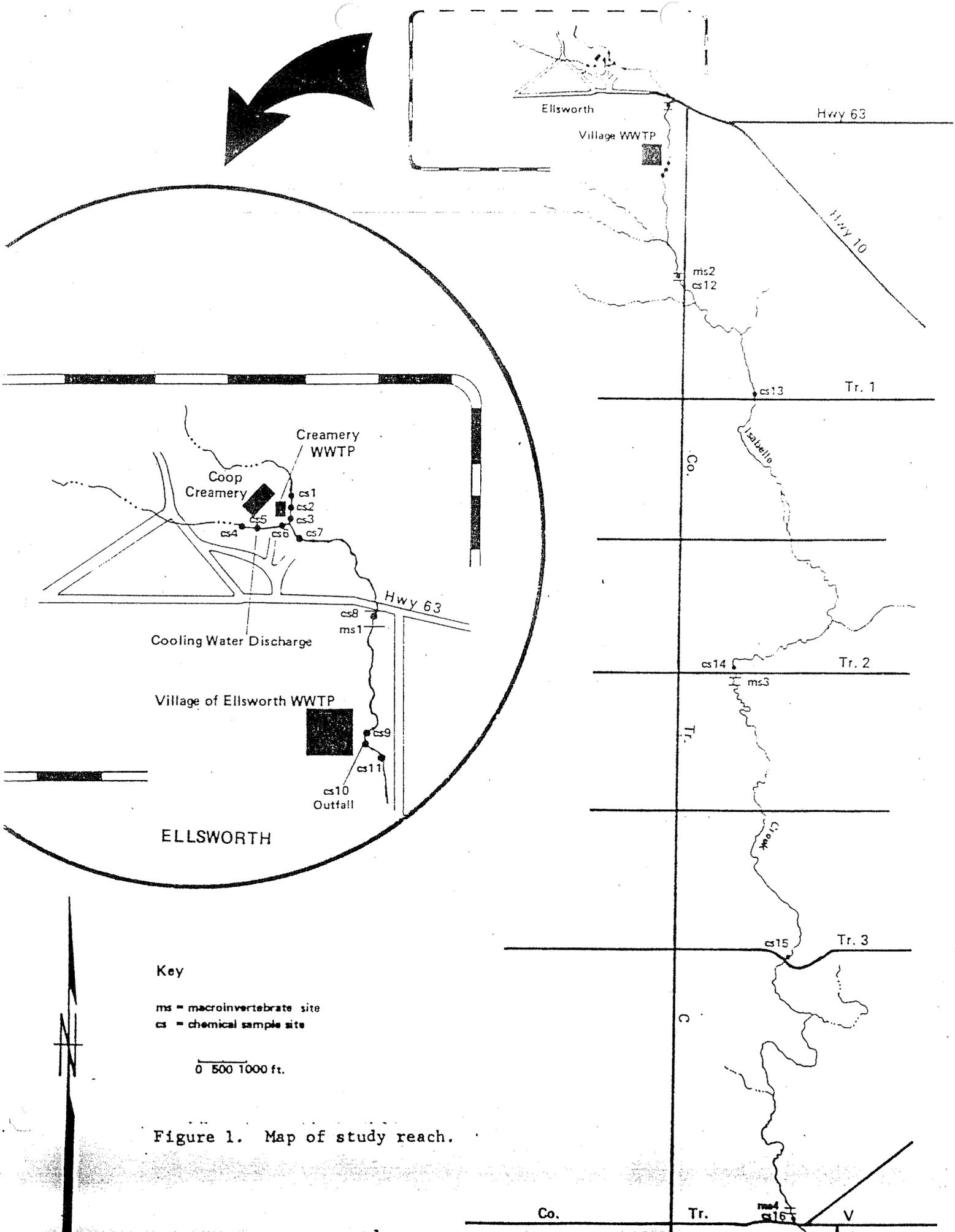


Figure 1. Map of study reach.

Recommendations:

Isabelle Creek shall be classified as a noncontinuous marginal use stream upstream from the town road on the section 28/33 section line.

Isabelle Creek in section 33 shall be classified as noncontinuous, intermediate aquatic life.

Isabelle Creek in section 4 (to CTH "V") shall be classified as a continuous flow, intermediate aquatic life stream.

Continuous flow, fish and aquatic life shall be the classification for Isabelle Creek downstream from CTH "V".

Evaluation Date: August 25, 1975

Personnel:

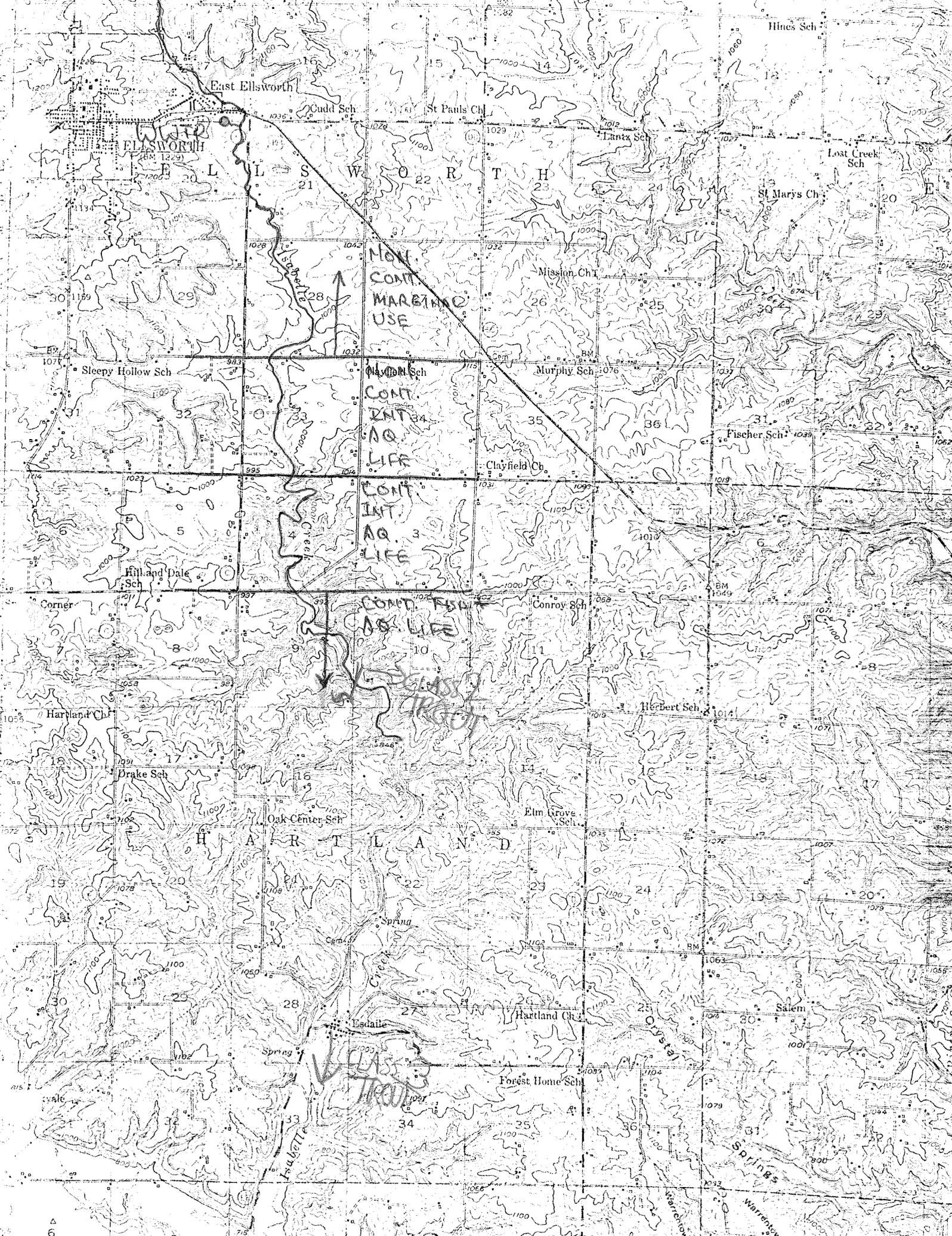
Lewis A. Seymour - Environmental Engineer - WCD
Terry A. Moe - Water Pollution Biologist - WCD
Bert J. Abelgren - Area Fish Manager - Menomonee Area
Richard E. Wedepohl - Engineer - Water Quality Evaluation - Madison
Ron Martin - Biologist - Water Quality Evaluation - Madison



Ellsworth - below WWTP at town rd.
above CTH V



Ellsworth - downstream view at CTH V



ELLSWORTH

E L L S W O R T H

MONT.
CONT.
MARSHLAND
USE

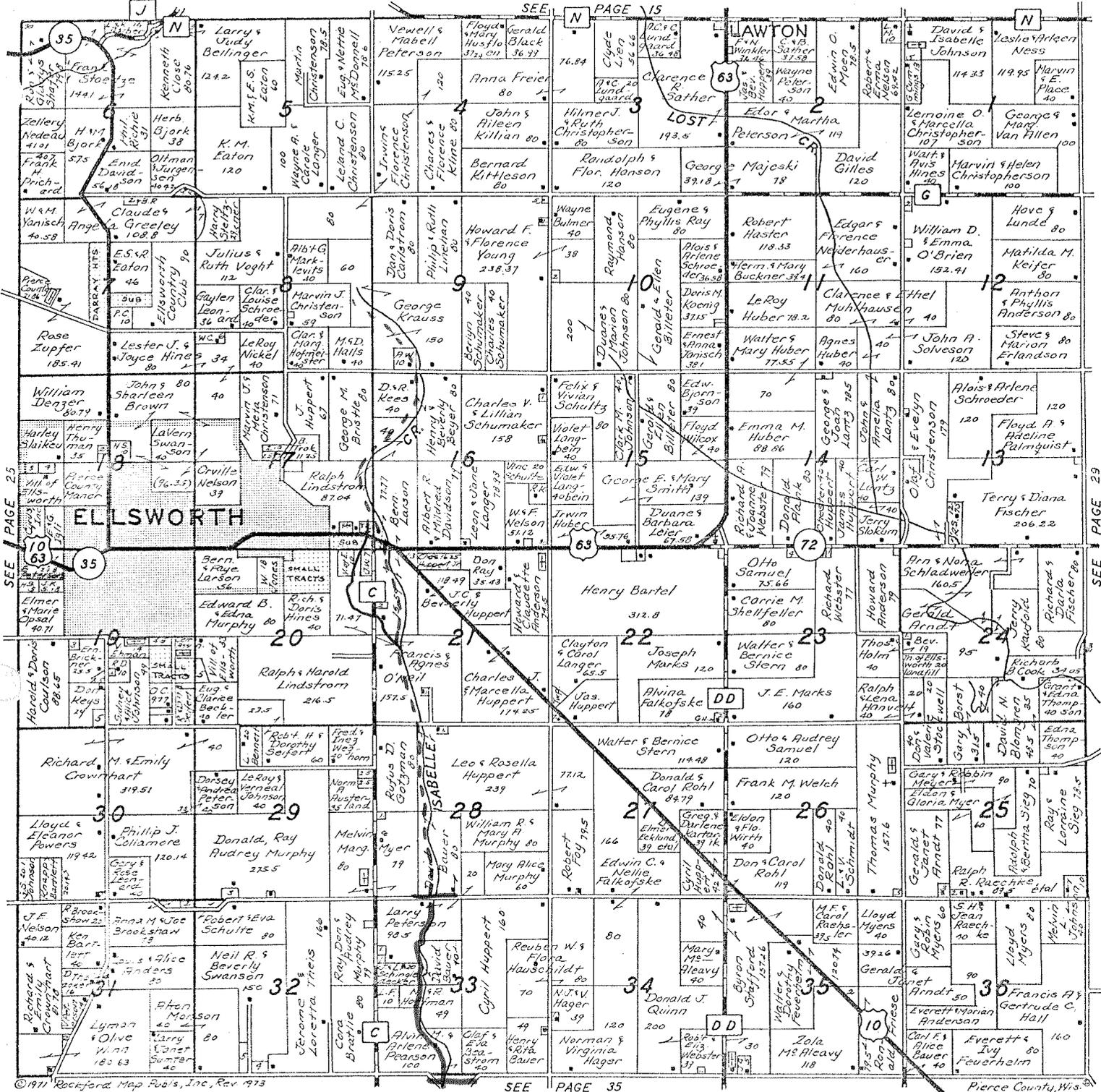
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LIFE

H A R L A N D

Crystal
Springs



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SEE PAGE 35

Pierce County, Wis.

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