

Prepared for
The Elkhart County
Drainage Board

Yellow Creek Drainage System

Investigation

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Prepared by
The Elkhart County
Surveyor's Office

INTRODUCTION

The Elkhart County Surveyor's Office has recently studied Yellow Creek and its' watershed in compliance with the Elkhart County Drainage Board's 1979-80 priority list for the reconstruction of ditches. Due to periodic flooding along the ditch, many residents of the area must tolerate frequent traffic hazards, crop and property damage, as well as generally unhealthy and unsafe conditions. The purpose of this study is to determine if any measures can be taken to relieve these drainage problems.

The Yellow Creek drainage system is one of the most important in the county. With a watershed encompassing approximately 7% of Elkhart County, Yellow Creek is responsible for draining land as far away as 3.5 miles from the main ditch. Currently the channel, particularly at some existing culverts, contains numerous structural inadequacies, Erosion, sedimentation, and over vegetation has altered the channels specifications creating a less than desirable situation.

The Yellow Creek drainage situation is relatively unique in that "strip development" along parts of the ditch, threatens to isolate and limit land use throughout the watershed. Such obstacles as private ponds, landscaped yards, parking lots and houses has greatly limited the options available for achieving the desired drainage throughout the watershed. Unless certain legal arrangement and/or financial settlements can be made, then relatively little reconstruction of the ditch is possible.

In addition, Yellow Creek is greater than 10 miles in length and contains significant wildlife and habitat, and therefore any reconstruction must be approved by the Department of Natural Resources. The conditions of this approval must be adhered to, and will likely futher limit the scope of this reconstruction.

This report, in conjunction with the Yellow Creek reconstruction plans, will summarize the causes of the drainage problems and the existing and anticipated obstacles to reconstruction in order that suitable recommendations may be submitted. The results of this investigation are herewith presented to the Elkhart County Drainage Board for it's review.

NATURAL CONDITIONS

History

Yellow Creek is a naturally occurring tributary of the Elkhart River which was formed in the glacial outwash regions of Harrison and Concord Townships. An 1874 description of the streams and rivers of Elkhart County describes Yellow Creek as ". . . an inconsiderable stream, rising in Harrison, and passing into the Elkhart River, in Concord Township."

Despite this inconsequential view of the stream, by 1894 local residents were realizing the importance of good drainage and the potential of Yellow Creek. In that year the County was petitioned to clean and repair Yellow Creek in sections 3, 9, 10, and 15 of Harrison Township. Although the project was approved but postponed until further notice, and apparently never completed, this was the first step towards a more comprehensive drainage project.

In 1909 the Elkhart County Commissioners were petitioned for the construction and reconstruction of a network of ditches in Harrison Township which utilized Yellow Creek as its primary outlet. This project involved cleaning Yellow Creek (the Jonas L. Whisler Ditch) from approximately CR 13 to Mishawaka Road. In addition the laterals of Owl Creek, Feters - Martin, Hoke, Feters - Pletcher, Bechtel, and Little Yellow Creek were either constructed or cleaned.

In 1918 Yellow Creek was apparently cleaned from Yellow Creek Lake to CR 36. This project complimented the 1909 project in that the bulk of Yellow Creek had been cleaned through the agricultural areas of the township.

1930 marked the last recorded major reconstruction of Yellow Creek. In that year the County Commissioners were petitioned to reconstruct the drainage system established in the 1909 Jonas L. Whisler petition.

Since 1930 the county has approved or initiated very little work on Yellow Creek. Several petitions for the cleaning of various laterals have been filed but few have been approved. The work that has been done on the main channel of Yellow Creek has been primarily that required to solve a particular local problem such as culvert replacements or channel straightening. Some private cleaning of the ditch has apparently taken place over the years, but not significantly enough to prevent flooding.

Today Yellow Creek periodically suffers from severe flooding which damages crops, property and closes or inhibits many roads in the watershed.

This report will investigate the causes of the hydrologic problems in the watershed and attempt to present the guidelines from which a more satisfactory situation can be derived.

Location and Size

Yellow Creek is located in sections 34, 33, 28, 21, 15, 10, and 3 of Harrison Township and sections 34, 35, 27, 26, 22, and 15 of Concord Township. The main channel is approximately 12 miles long and has its headwaters in Yellow Creek Lake. Ultimately the Yellow Creek empties into the Elkhart River.

There are several legal laterals to Yellow Creek such as Stauffer Ditch, Bechtel Ditch, Fulmer Ditch, Brock Ditch, Hoke Ditch, Owl Creek, Feters - Martin Ditch, Kehr Ditch, Little Yellow Creek, Shaffer Ditch and Stutzman Ditch. In addition, there are numerous private tiles and ditches which utilize Yellow Creek as an outlet.

The Yellow Creek watershed is composed of some 21,000 acres or 32.8 square miles, making this one of the most important drainage networks in the county. Figure 1 delineates the watershed boundaries and sections incorporated within it.

Soils

The soils of the Yellow Creek watershed are important to the hydrological condition of the ditch because of their influence to runoff volume. The infiltration and percolation characteristics of an individual soil series indicates their potential to absorb rainfall and thereby reduce the amount of direct runoff. This information is particularly important in order to determine suitable runoff coefficients for the area.

The Elkhart County Soil Survey (1974) identifies three different soil associations within the Yellow Creek watershed:

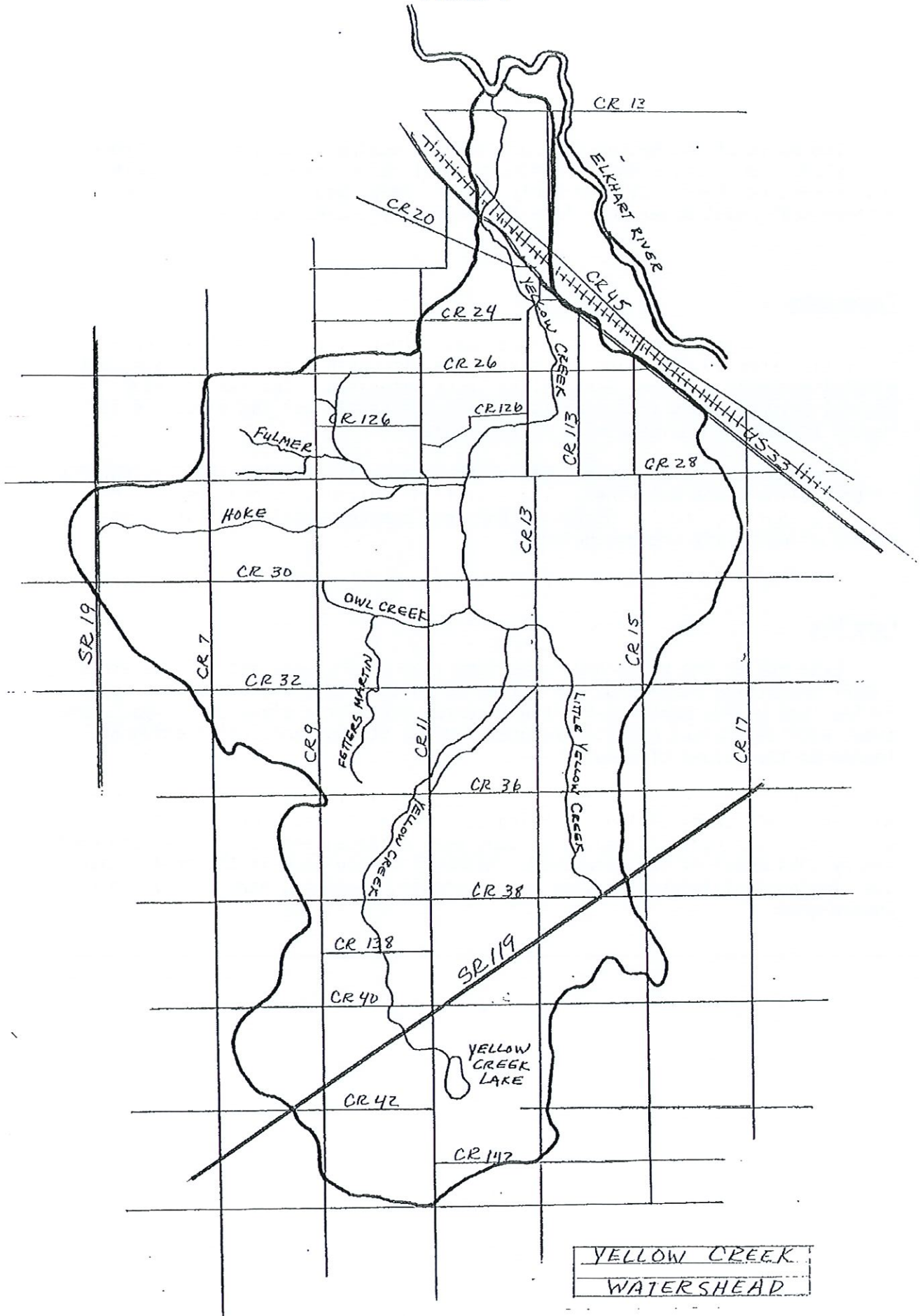
Carlisle - Tawas Association which is located within the depression of the glacial outwash. The soils of this association developed as a direct result of being overlain with standing water (marshland). These soils are deep, very poorly drained, very dark colored muck soils that have developed in organic matter. The principle soil series which make up the Carlisle - Tawas association are Carlisle, Tawas, Linwood, and Edwards.

Oshtemo - Fox Association is located in the glacial outwash plain. Here water should slowly runoff the surface. As a result, this association is deep and moderately deep over sand and gravel, somewhat excessively drained to well drained, coarse textured and moderately coarse textured soils. Characteristic soil series of this association are Oshtemo, Rox, Tawas, Gilford, and Sevewa.

The Riddles - Crosby - Miami Association is located in the glacial moraine. This association is deep, well drained to somewhat poorly drained, moderately coarse textured and medium textured soils. Riddles, Crosby, Miami, Brookston, Carlisle, Delrey, Haskins, Metea, Oshtemo, and Rawson Soil Series make up the Riddles - Crosby - Miami association.

Table 1 lists the individual soils series found in the basin, their hydrologic soil group, their permeability and approximate depth to groundwater.

FIGURE 1



The soils of the hydrologic soil group B dominates in the Yellow Creek watershed. These soils have a moderate infiltration rate when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse texture.

Topography

The physiography of the watershed was primarily formed by the glacial activities some 10,000 years ago during the Wisconsin Ice Age. Two dominant glacial geologic features form Yellow Creek watershed. The nearly level glacial outwash areas in the northeast and the gently rolling glacial drift region throughout the remainder of the region.

The U.S.G.S. topographical map of the region illustrates the physiography of the Yellow Creek watershed. The elevations extremes encountered in the area are 950+['] to 760+[']. Slopes in the area average about 2-3% but steeper slopes of up to 10% are encountered.

Land Use

Land use in the watershed is as important as the soil types in determining runoff quantities because of its influence on infiltration rate of the soil. Fallow land yields more runoff than forested land for a given soil type. Covering areas with impervious material reduces surface storage and infiltration and increases the volume of runoff.

In the Yellow Creek watershed, agriculture is the predominate land use. As much as 17,900 acres of land is being utilized as tillable or pasture land in the watershed. Residential/industrial land uses utilizes some 1700 acres and woodlots occupy 1350 acres of the watershed. Although agriculture is the predominate land use, residential/industrial land use is growing steadily, particularly in the Dunlap area.

HYDRAULIC CONDITIONS

The current hydraulic condition of Yellow Creek is relatively poor. Such problems as poor hydraulic grade, sedimentation, vegetation and structural barriers (dams), make Yellow Creek inadequate to carry the quantities of water required of it.

The accompanying plans and profile of Yellow Creek illustrate the particular hydraulic grade problems in the ditch. Topographic features of the area will permit achieving a more desirable grade through reconstruction of the ditch. Such proposed hydraulic grades are also illustrated on the plan and profiles.

In addition to inadequate slope, flows in the ditch are being obstructed in many spots by brush, logs, trees, debris as well as many intentional structures. When flows in the ditch are impeded by such structures, the flow velocity and momentum will be dramatically reduced. The result is a "damming" effect leading to flooding, erosion, and sedimentation.

The road crossing structures across Yellow Creek are primarily bridges although some culverts do exist. In general these have adequate openings for flow and will not require enlarging. When this project reaches the implementation stage, certain culverts will require lowering and the bridges must be assured of their stability under these new circumstances.

Recommendations

Based on the Elkhart County Surveyor's Office examination of the Yellow Creek Ditch these recommendations are offered:

1. That the hydraulic grade of Yellow Creek can be improved as proposed on the accompanying plans.
2. That all brush, logs, trees, and debris, be removed from the channel and on the banks. This material must be buried, burnt, or removed from the site.
3. Only the bottom of the ditch will be altered. The width of the ditch will remain basically unchanged.
4. The water level of Yellow Creek lake will be maintained.
5. The construction of fish/sedimentation traps along the ditch have been proposed.
6. Grass seeding of graded spoil is necessary.

7. The people along the ditch should be made aware of the easement along the ditch and the laws pertaining to it.
8. The Elkhart County Surveyor's Office also points out that although this project has been designed to minimize damages to the personal property of effective land owners, some adverse effects to private ponds and landscaping are anticipated. In our opinion, the hydraulic grade which we propose on our plans is minimum and must be maintained with out regards to private ponds in or near the 150 foot corridor. It is therefore recommended that the Drainage Board recognize this necessity and begin to consider solutions.