

KANKAKEE SEDIMENT PROPOSAL

Introduction

The Kankakee River (fig 1.), located in northeastern Illinois and northwestern Indiana, has undergone extensive changes over the past 80 years. The headwaters of the Kankakee River are near South Bend, Indiana, and the mouth is the confluence of the Kankakee with the Des Plaines River, where those two rivers become the Illinois River.

The first Europeans to descend the Kankakee River were De La Salle and Father Hennepin in 1679. From their entry point near South Bend, Indiana, down to Momence, Illinois, the river meandered more than 240 miles through an area called the Grand Marsh. During this time, the Grand Marsh encompassed approximately 400,000 acres and ranged in width from 3 to 5 miles. This area was full of wildlife and became a favorite area for hunting and fishing in the late 1800's. Presidents Grover Cleveland and Theodore Roosevelt were known to have hunted in the Grand Marsh.

In Indiana, drainage of the Grand Marsh for intensive agricultural use and the channelization of the river has led to increased sedimentation in the downstream reaches in Illinois. This work, effectively completed by 1918, reduced the length of the river between South Bend and Momence from approximately 240 miles to approximately 85 miles. In contrast, the Kankakee River in Illinois has remained a natural meandering stream. The river

in Illinois is used as a scenic, cultural, and recreational resource. The reach between the State line and Momence, Illinois is a relatively undisturbed wetlands, the last remnant of the Grand Marsh, locally known as the Momence Wetlands.

Sedimentation in the river in Illinois has been of major concern to Illinois residents for many years. The Illinois State Water Survey (ISWS) and the Illinois State Geological Survey (ISGS) conducted investigations and prepared a number of reports in the late 1970's and early 1980's addressing these concerns (Bhowmik and Bogner, 1981; Bhowmik and others, 1980; Gross and Berg, 1981). They concluded that extensive drainage of the wetlands and channelization of the Kankakee River did cause increased sedimentation, but, by the early 1950's, the River had reached equilibrium and further sedimentation was not observed. The authors of the reports expressed concern that these observations were based on at most 2 years of data collection and that the equilibrium they observed may be a temporary condition (Ivens and others, 1981). However, during the 11 years since the State studies were completed, Illinois residents, who make use of the river continue to be concerned about whether or not sedimentation has continued to increase.

Objective

*Sources
of
sedimentation?*

The objective of this study, for the Illinois portion of the river, is to (1) determine the long-term sedimentation rate in the flood plain, (2) determine changes in channel geometry and

volume over the past 30 years, and (3) begin a long-term suspended-sediment monitoring program.

Approach

As mentioned earlier, the State Surveys have done a tremendous amount of work on the Kankakee River. This project will build on and extend their work.

In order to meet the above objectives, the following approach is proposed. Long-term sedimentation rates will be estimated using dendrogeomorphic techniques. Changes in channel geometry will be determined for selected reaches of the river over the past 30 years. A long-term sediment monitoring program will be initiated that will be used to calculate a sediment budget. Each of these tasks are outlined below.

Determination of Sedimentation Rate

Recently, the U.S. Geological Survey (USGS) has developed dendrogeomorphic techniques for determining long-term sedimentation trends on flood plains (Hupp and Morris, 1990). This involves dating the age of a tree and comparing the age with the depth of sediments over the initial lateral tree roots. Thus, the earliest date from which sedimentation rates can be determined is dependent on the age of the oldest tree examined. This method

will be used to determine the long-term sedimentation rates of the flood plain of the Kankakee River in Illinois.

What About Indiana?
The purpose of examining the sedimentation rates of the flood plains is to determine if there has been a change in the rate of sedimentation. By examining trees of varying ages the sedimentation rate for each decade can be determined, these rates will show if the sedimentation rate has increased, decreased, or stayed level over the period for which these rates can be determined.

Determination of changes in channel geometry

The Illinois Division of Water Resources (DWR) collected a set of cross-sectional soundings from the Kankakee River in 1966-67 and 1977-78. These soundings were collected from the confluence of the Kankakee River with Singleton Ditch to the dam at the City of Kankakee. In addition, the ISWS, as part of their 1980 study, established permanent surveying monuments from the State line to the confluence with Singelton Ditch. Cross-sectional soundings were then collected in order to monitor changes in the river relative to a baseline.

The USGS will resurvey both the DWR and the ISWS cross sections and compare them with the earlier soundings to evaluate any significant changes in channel geometry and to determine the recent history of channel aggradation or degradation.

Long-term suspended sediment monitoring

During the 1979 and 1980 water years daily sediment samples were collected by the USGS at the Kankakee River at Momence and Wilmington and at the Iroquois River at Iroquois and Chebanse. Two of these sediment sites, Momence and Chebanse, will be reactivated in order to compare current sediment loads with that calculated earlier and to begin a long-term suspended sediment monitoring program to determine trends in sediment loading. Collection of sediment data at Kankakee River at Wilmington is currently being conducted by the ISWS and that data will be obtained and analyzed.

Reports

Two Water-Resources Investigations Reports are planned. The first will describe the dendrogeomorphic techniques and results. The second will describe the results from channel geometry investigation. Data from the operation of the two long-term suspended sediment stations will be published in the Illinois District's annual hydrologic data report.

Manpower

One GS-12 hydrologist will serve as project chief. Hydrologic technicians from the field offices will be used to assist with data collection and cross-section surveying. In addition, research personnel from the National Research Program will assist with the dendrogeomorphic investigation.

Budget

<u>Category</u>	Yearly Budget		
	1992	1993	1994
National Research Program	\$9,500	\$5,000	--
Travel	\$4,000	\$5,200	\$1,000
Vehicles	\$3,700	\$3,700	\$1,900
Materials and supplies	\$1,900	\$1,900	\$1,900
Sediment Stations	\$26,200	\$26,200	\$26,200
<u>Salary</u>	<u>\$54,700</u>	<u>\$58,000</u>	<u>\$79,000</u>
Total	\$100,000	\$100,000	\$100,000

References

Bhowmik, N.G., and Bogner, W.C., 1981, Sediment Transport and Hydraulics of Flow in the Kankakee River, Illinois - Phase II. Illinois State Water Survey Contract Report 282, 67 p.

Bhowmik, N.G., Bonini, A.P., Bogner, W.C., and Byrne, R.P., 1980, Hydraulics of Flow and Sediment Transport in the Kankakee River in Illinois. Illinois State Water Survey Report of Investigation 98, 170 p.

Gross D.L., and Berg, R.C., 1981. Geology of the Kankakee River System in Kankakee County, Illinois. Illinois State Geological Survey Environmental Geology Notes 92, 80 p.

Hupp, C.R., and Morris, E.E., 1990, A Dendrogeomorphic Approach to Measurement of Sedimentation in a Forested Wetland, Black Swamp, Arkansas: Wetlands, Volume 10, no. 1, p 107-124

Ivens, J.L., Bhowmik, N.G., Brigham, A.R., and Gross, D.L., 1981, The Kankakee River Yesterday and Today: Illinois State Water Survey Miscellaneous Publication 60, 24 p.

Source: KANKAKEE RIVER BASIN.
U.S. Department of Agriculture, 1983.

