

**AERIAL ASSESSMENT REPORT FOR
NORTH FORK KASKASKIA RIVER**

FAYETTE, MARION AND CLINTON COUNTIES

SEPTEMBER 2005

Prepared by Wayne Kinney for IL. Department of Agriculture

The North Fork Kaskaskia River Watershed TMDL report prepared by LimnoTech, Inc. determined that segments OKA 01 and OKA 02 are impaired waterbodies. These two segments make up the entire main channel of the North Fork Kaskaskia River from Lake Carlyle to the upper reaches southwest of St. Peter, IL. Each of these segments have been found to be impaired by Manganese, Iron (dissolved), pH and Dissolved Oxygen. According to the August 2004 Quarterly Report prepared by Limno-Tech, Inc. potential sources of impairment for Manganese and Iron include streambank erosion of soils naturally enriched with iron and manganese. Sources for which this assessment will present recommendations.

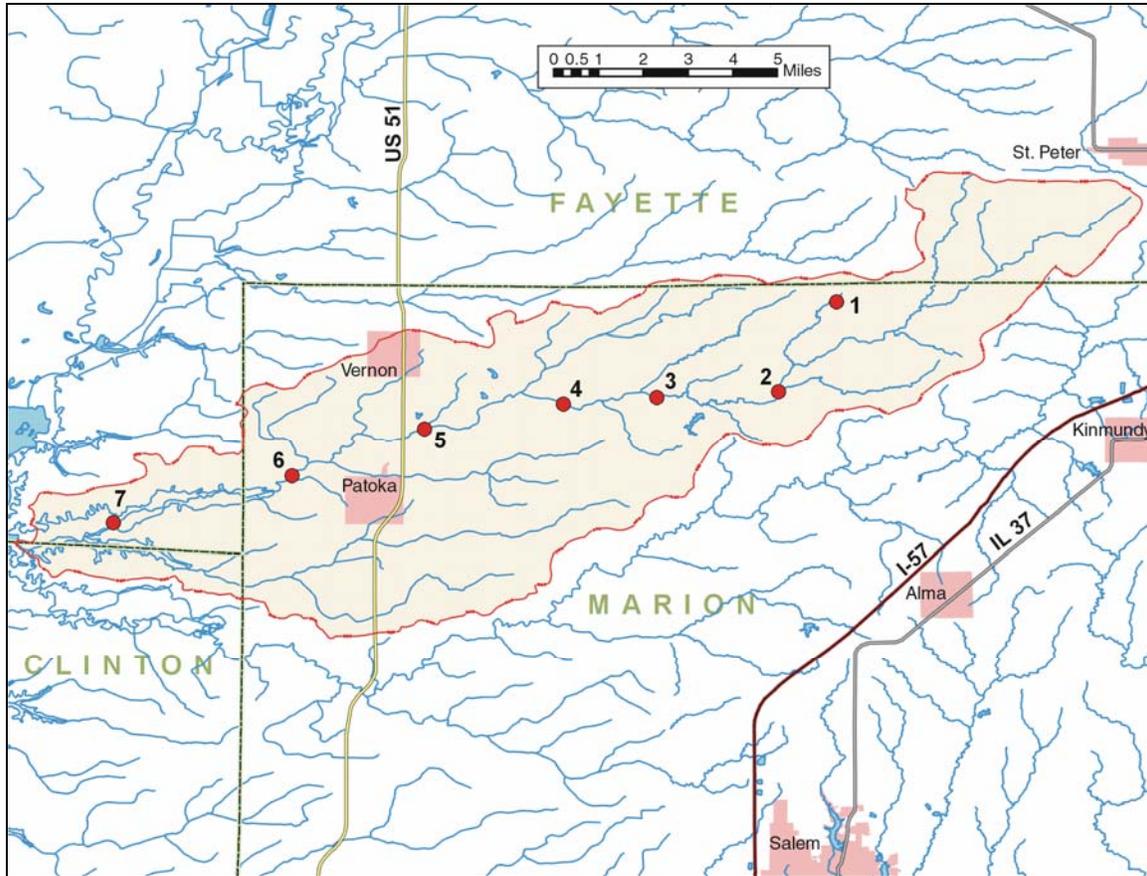


Fig. 1 Aerial Assessment Map of North Fork Kaskaskia River

Assessment Procedure

Low level geo-referenced video was taken of North Fork Kaskaskia River in March, 2004. Video taping was completed by Fostaire Helicopters, Sauget, IL, using a camera mounted beneath a helicopter to record data from just above tree top level in DVD format for further evaluation and assessment. Video mapping began near Road 1000E in Marion County approximately 6 miles northwest of Kinmundy, IL. The mapping progressed downstream to Carlyle Lake in Clinton County. Aerial video of tributaries was not part of the project, regardless of the stream size or vegetation.

After videotaping the stream, the DVD tapes were processed by USGS to produce a geo-referenced DVD showing flight data and location. Next, USGS identified features from the video and created shapefiles containing the GPS location, type of feature identified, and the time on the DVD to allow cross referencing. The shape-files along with the DVD were then used to identify and locate the points where ground investigations were needed to verify aerial assessment assumptions and gather additional data.

The ground investigations or “ground truthing” is intended to accomplish two primary functions. First, it provides those viewing videos the opportunity to verify the correct interpretation of the video. Second, the video allows the user to identify and gather field data at the most appropriate locations to more closely represent the entire study portion of the stream.

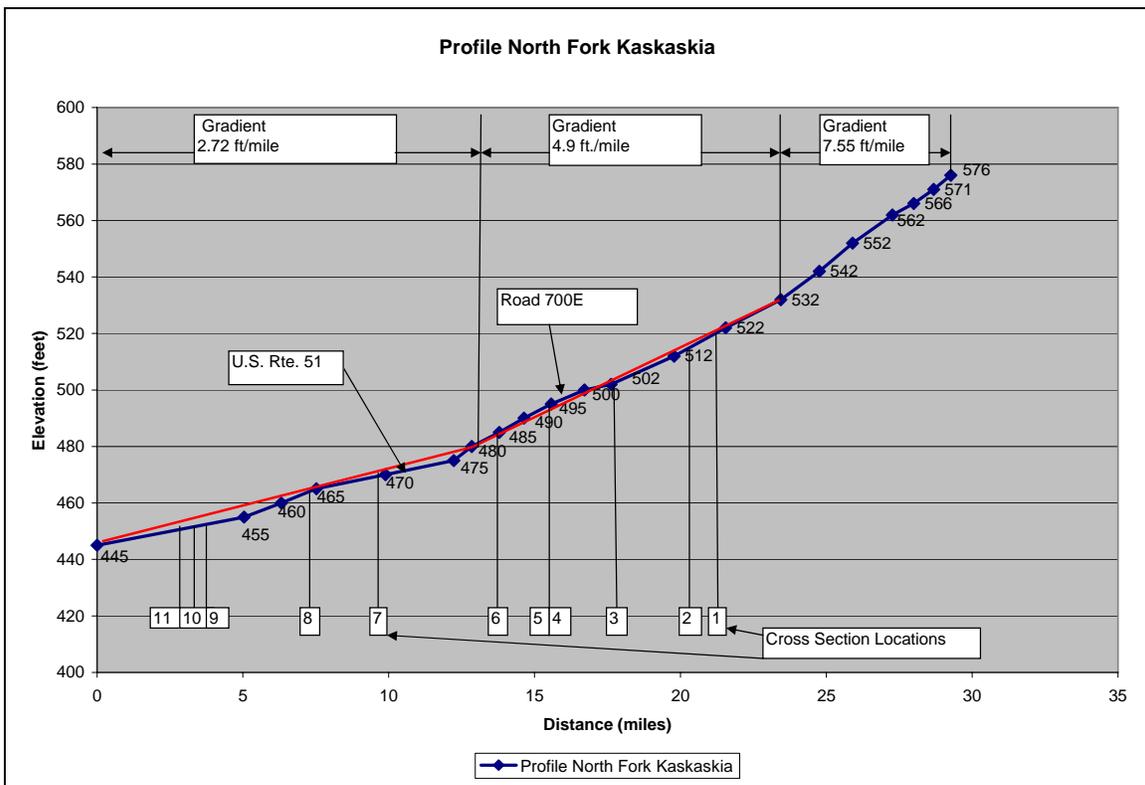


Figure 2 Channel Profile of East Fork Kaskaskia River

Detailed elevation data is not available; therefore the channel slope is calculated from USGS topo maps by measuring the channel length between contour lines. The report refers to this as “valley profile” although a true valley profile would use a straight line distance down the floodplain rather than channel length. However, this method is used because it incorporates sinuosity into the calculation and allows the channel slope to be assume equal to “valley slope” in order to estimate channel capacity, velocity, etc., although there are short segments where the channel slope may differ significantly near roads, logjams, knickpoints, etc.

| CHAPTERS ON DVD AND ASSESSMENT REPORT North Fork Kaskaskia River | | | | |
|---|-------------|----------------|----------------|----------------|
| DVD Disc | DVD chapter | Beginning Time | Report Chapter | Cross Sections |
| 1 | 2 | 10:00 | 1 | 1 |
| 1 | 3 | 20:00 | 2 | 2,3 |
| 1 | 4 | 30:00:00 | 3 | 4,5 |
| 2 | 2 | 10:00 | 4 | 6,7 |
| 2 | 3 | 20:00 | 5 | |
| 2 | 4 | 30:00:00 | 6 | 8,9,10,11 |
| 2 | 5 | 40:00:00 | 7 | |

Fig. 3 DVD Chapters and Report Guide

The DVD has been divided into “chapters” of approximately ten minutes of video (Fig. 3) to enhance the ability to navigate within the flight video and provide a simple way to identify and discuss different stream segments. Although the report will begin with a broader more general assessment of the entire study reach, it will also provide an assessment and treatment recommendations by chapter or group of chapters. The chapter divisions are clearly arbitrary and do not reflect “change points” in the stream characteristics or treatment recommendations. For clarity the conclusions and recommendations are presented for each stream “chapter”.

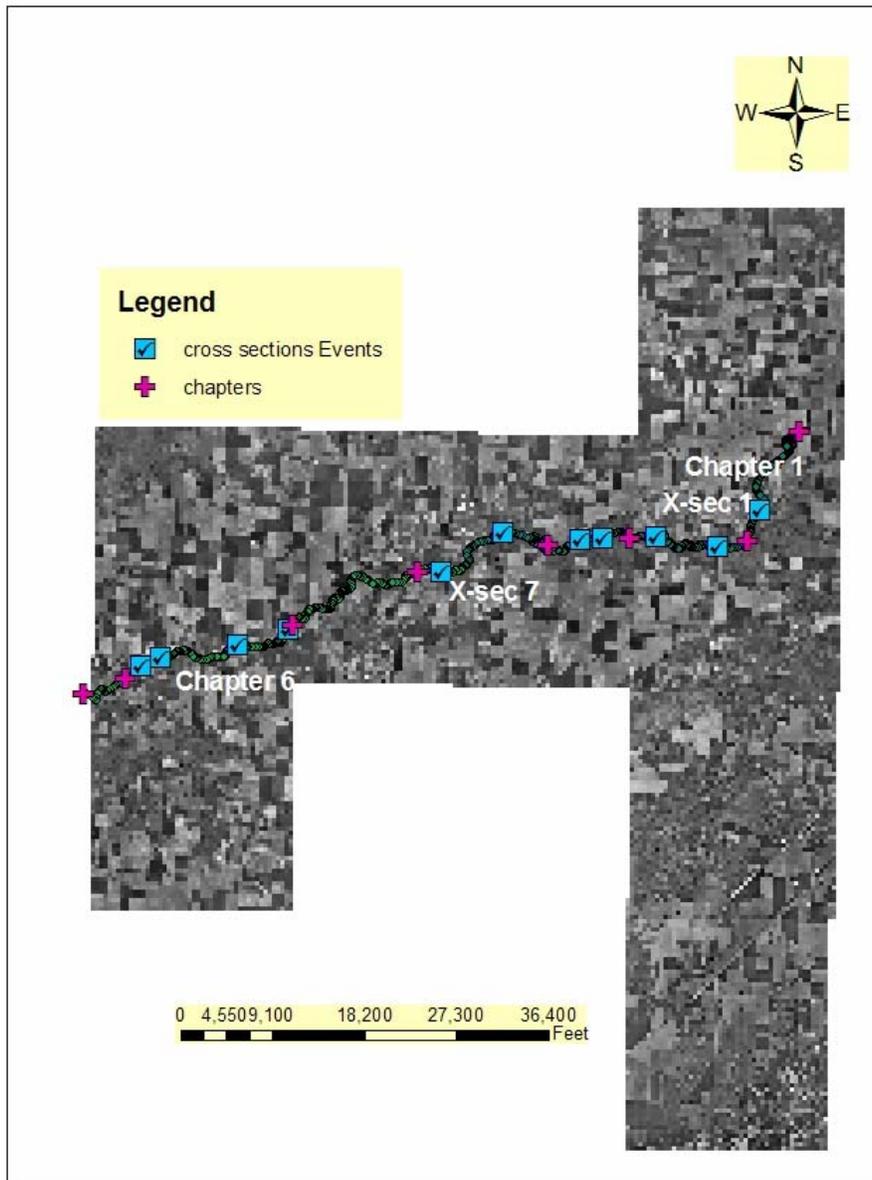


Fig. 4 Chapter Division and Cross Section locations

The major factors indicating channel conditions identified from the aerial assessment have been totaled by DVD chapter in Table 1 below. This tabulation allows a general comparison of the relative dominance of features found in each chapter and provides a

means of comparing stream characteristic between chapters. A discussion of the major differences will follow later in this report.

| FEATURES IDENTIFIED BY CHAPTER | | | | | | | |
|--------------------------------|---------|---------|---------|------------|---------|---------|-----|
| CHAPTER | ROCK | GEOTECH | | BED | BREAK | EROSION | |
| | OUTCROP | LOGJAM | FAILURE | DEPOSITION | CONTROL | POINT | |
| 1 | 0 | 0 | 3 | 1 | 0 | 22 | 22 |
| 2 | 0 | 7 | 5 | 0 | 0 | 8 | 63 |
| 3 | 0 | 9 | 3 | 0 | 1 | 9 | 56 |
| 4 | 1 | 12 | 2 | 0 | 3 | 6 | 69 |
| 5 | 0 | 6 | 2 | 1 | 2 | 7 | 79 |
| 6 | 2 | 5 | 0 | 1 | 1 | 0 | 89 |
| 7 | 0 | 0 | 5 | 0 | 0 | 0 | 16 |
| TOTALS | 3 | 39 | 20 | 3 | 7 | 52 | 394 |

Table 1 Features by Chapter Identified with Aerial Assessment

Eleven cross sections were taken at selected locations on the North Fork Kaskaskia River after viewing the DVD's. The cross sections are located at "riffle" locations to best represent the channel characteristics and to allow for comparison of width, depth, x-sec. area, etc. along the channel at similar geometric locations. The result of the hydraulic analysis at each site is presented in summary form in Table 2 and the approximate location of each cross section along the channel profile is found in Fig. 2. Aerial views of cross sections locations and identified features are shown in Figs. 9 thru 15. Exact locations as Eastings and Northings and more detail can be found in Appendix A.

| Cross Section Summary-- North Fork Kaskaskia River | | | | | | | | | | | | | | | |
|--|---------|----------|----------------|-----------------|-----------|-----------|------------|--------------|---------------|-----|-------------|---------------------|----------------|----------------|--------------------|
| X-Sec | Easting | Northing | ADA Sq. Mi. | Valley | | Q2 CFS | BKF CFS | Width ft. | Mean Depth | W/D | Vel. FPS | Bedload In. Dia. | CEM (Simon) | CFS sq. mi. | BKF cfs /Q2 cfs |
| | | | | Slope ft/mi. | Q2 CFS | | | | | | | | | | |
| 1 | E329699 | N4295973 | 15.3 | 6.7 | 747 | 500 | 36 | 4.58 | 7.86 | 3 | 1 | 3 | 32.7 | 0.67 | |
| 2 | E328409 | N4294881 | 19.17 | 6.7 | 966 | 522 | 35 | 4.79 | 7.31 | 3.1 | 1 | 3 | 27.2 | 0.54 | |
| 3 | E326571 | N4295146 | 21.61 | 6.2 | 1023 | 523 | 41 | 4.32 | 9.49 | 3 | 1 | 3 | 24.2 | 0.51 | |
| 4 | E324966 | N4295138 | 24.46 | 6.2 | 1128 | 566 | 43 | 4.41 | 9.75 | 3 | 1 | 2 | 23.1 | 0.50 | |
| 5 | E324264 | N4295075 | 27.08 | 6.2 | 1223 | 624 | 48 | 4.37 | 11 | 3 | 1 | 4 | 23.0 | 0.51 | |
| 6 | E321941 | N4295285 | 34.68 | 5.9 | 1452 | 595 | 38 | 5.91 | 6.43 | 2.6 | 1 | 2 | 17.2 | 0.41 | |
| 7 | E320087 | N4294120 | 36.83 | 5.1 | 1419 | 658 | 47 | 5.45 | 8.62 | 2.6 | 1 | 3 | 17.9 | 0.46 | |
| 8 | E315439 | N4292365 | 51.33 | 4.7 | 1774 | 804 | 51 | 5.88 | 8.67 | 2.7 | 1 | 3 | 15.7 | 0.45 | |
| 9 | E313939 | N4291900 | 54.33 | 4.7 | 1855 | 883 | 53 | 6.07 | 8.73 | 2.7 | 1 | 3 | 16.3 | 0.48 | |
| 10* | E311609 | N4291507 | 57 | 4.7 | 1927 | 533 | 36 | 5.81 | 6.2 | 2.5 | 1 | 3 | 9.4 | 0.28 | |
| 11 | E310990 | N4291279 | 57.31 | 4.7 | 1935 | 825 | 58 | 5.49 | 10.56 | 2.6 | 1 | 4 | 14.4 | 0.43 | |

X-sec 10 is located in a reach having a split flow through another channel during high flows

Table 2 Cross Section Summary

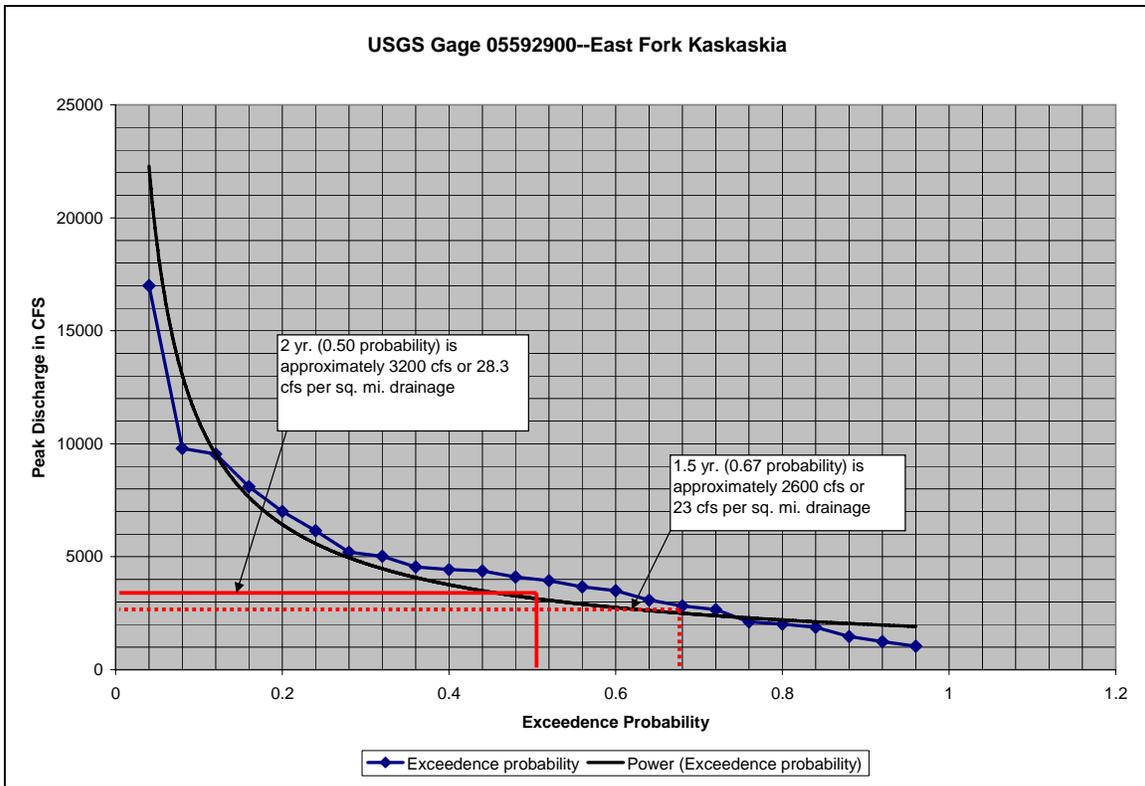


Fig. 5 Annual Maximum Peak Probability Curve: USGS Gage #05592900

USGS stream Gage #05592900 on the East Fork Kaskaskia River is approximately 5 miles south of the North Fork Kaskaskia River. Landuse, soils, etc. do not differ significantly between these two streams. This assessment will use the data from this gage to determine the probable flow in North Fork Kaskaskia.

A plot of the discharge probability curve from USGS Gage # 05592900 over the last 24 yrs. of continuous record (1981-2004) in Fig. 5 indicates the 2 yr. discharge (50% probability) at approx. 3200 cfs and the 1.5 yr. discharge (67% probability) at approx. 2600 cfs. The drainage area at Gage # 05592900 near Sandoval, IL. is 113 sq. miles; therefore the discharge per sq. mile is 28.3 and 23 cfs per sq. mile respectively for the 2 yr. and the 1.5 yr. R.I. discharge. The field determined “bankfull” discharge in the study area for the North Fork ranges from 14.4 to 32.7 cfs/sq. mile, after discarding cross section 10 which has a split channel. Referring to Table 2 and discarding cross section 1 at the very upper end and cross section 10 the data indicates the bankfull discharge per square mile is 15 to 40% higher that found on the East Fork Kaskaskia. (Fig. 5) This difference may be a true “difference” or it may be due to the difficulty of identifying “field indicators” on incising streams. If it is the latter, North Fork Kaskaskia is incised even more than the cross section data indicates due to falsely determining “bankfull indicators” based on past channel geomorphology.

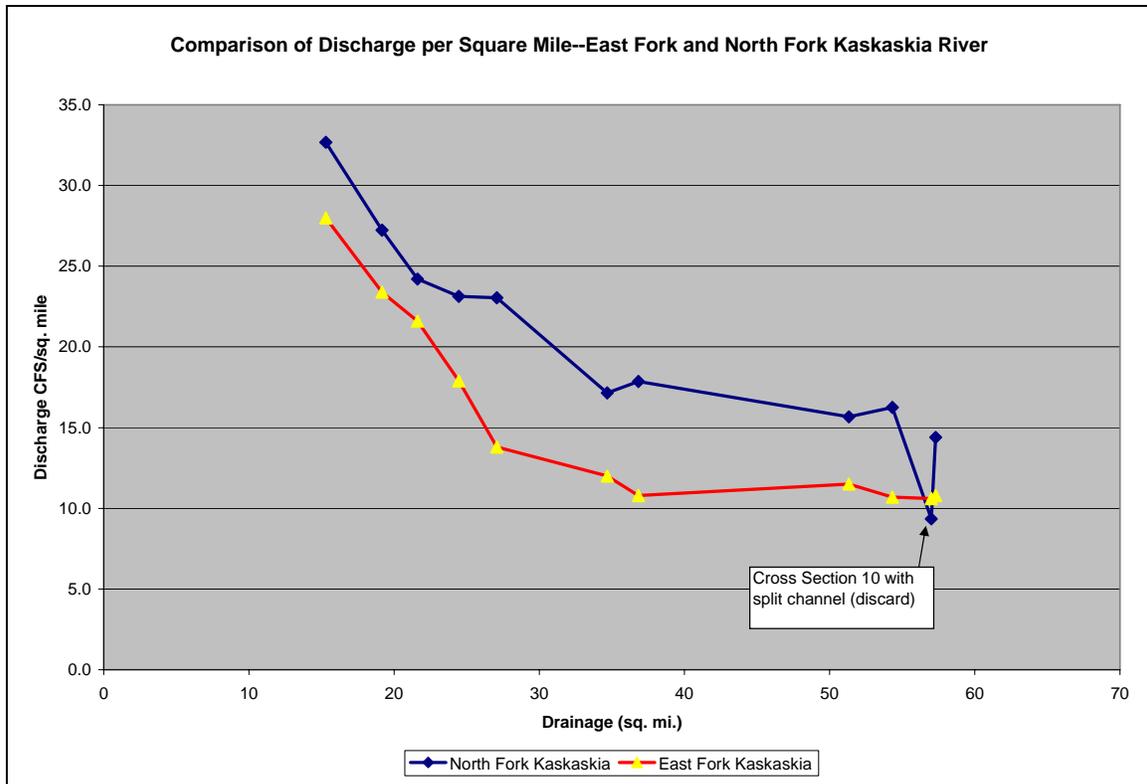


Fig. 6 Discharge comparison per square mile

General Observations

1. Based on cross section data North Fork Kaskaskia has a bankfull discharge average of 49% of the predicted 2 yr. discharge rate. This compares to 36% found on East Fork Kaskaskia.
2. Nine of eleven cross sections have been determined to be downcutting or widening, CEM Stage 3 or 4.
3. North Fork appears to be generally downcutting with areas of degradation found at points scattered throughout the entire main channel.
4. The channel bedload material is consistently less than 1 inch in diameter and dominated by silt and clay. With very little larger material there is very little turbulence within the channel at low flow to increase DO. Increasing turbulence within the channel at low flow by installing Rock Riffles would be beneficial for both DO and bed stability.
5. There are 394 erosion sites identified by the aerial assessment within the impaired reach. Streambank erosion at these sites is suspected of contributing to the manganese and iron impairments. Many, if not most could be stabilized with installation of a riffle-pool sequence to dissipate energy in deepened pools and turbulent flow over riffles.
6. With the fine bedload material found in North Fork the bedload transport continuity should not be interrupted with a riffle-pool sequence. Recommendations include cost for both riffle-pools installation and lateral bank

protection; however the cost of lateral protection can be reduced dramatically if riffle-pool structures are installed in the same reach.

7. There are no significant differences in stream morphology or CEM stage between DVD chapters along the main channel of North Fork Kaskaskia River. Therefore the recommendations are consistent through the entire study reach.

Recommendations: Chapter 1 through 7

This assessment covers approximately 20.4 miles of North Fork Kaskaskia River ending at Carlyle Lake. The entire reach has been determined to be an impaired waterbody. Field investigation coupled with the aerial DVD images have concluded that the entire reach is impacted by degradation. While there are sections near existing road crossings, water intake reservoirs, etc. where the degradation has been controlled, the recommendation is to install a riffle-pool sequence for this entire reach by installing Rock Riffle Grade control as needed to stabilize the bed throughout.

Installation of the Rock Riffles should be at an average spacing of 6 bankfull widths, 250 ft. in chapter 1 and 2, 300 ft. in chapter 3 thru 5 and 350 ft. in chapter 6. The height of all structures is estimated to be 2.0 to 2.5 ft. above the channel bed as determined by preliminary calculations to prevent any increase in flooding or backwater. The taller structures being located in the lower reaches where incision has been most severe. Table 3 provides an estimate of the quantity of stone and cost to install these structures. Table 3 also list the estimated quantities and cost for lateral bank treatment on the North Fork Kaskaskia River. However, first priority should be to install the Rock Riffle and then re-evaluate the need for lateral bank treatment. It is anticipated that the lateral bank treatment needs will diminish significantly as a result of the installation of Rock Riffle Grade Control Structures. The exception is Chapter 7, where the recommendation to install only lateral bank protection as the backwater effects of Carlyle Lake make installation of Rock Riffle in this chapter unnecessary.

Establishment of the riffle-pool sequence described will have a positive effect on re-aeration to increase DO. By constructing the riffles with narrow low flow widths and emergent stones to increase roughness the impact on DO can be maximized.

The riffle-pool sequence will also positively impact the amount of soils material entering the stream from streambank erosion. The soil material eroded from streambanks is suspected of being a major contributor to the manganese and iron found within North Fork Kaskaskia River.

Beginning in Chapter 3 and extending into Chapter 4 is a section of North Fork with two distinct channels. (Fig.7) Both have flow currently, however the northern channel is the historic channel and the new channel “cutoff” is 3000 ft. of developing channel that will enlarge generating a large amount of sediment. There is a similar “split channels” on DVD Disc.2 at 38:08 (cross section 10) with a definite knickpoint in the new channel. This cutoff will also generate a large amount of sediment as it assumes full flow.



Fig. 7 Downstream confluence of split channel in Chapters 3 and 4



Fig. 8 Example of lateral streambank erosion downstream of Patoka

| TREATMENT --CHAPTERS 1 THRU 7 | | | | | |
|--------------------------------------|----------------------|---------------------------|---------------------|--------------------------|-------------------|
| Lateral Bank Protection | | | | | |
| Chapter | Erosion Sites | Average Length(ft) | Total Length | Average Cost/foot | Total Cost |
| 1 | 22 | 200 | 4400 | \$25.00 | \$110,000.00 |
| 2 | 63 | 200 | 12600 | \$25.00 | \$315,000.00 |
| 3 | 56 | 200 | 11200 | \$25.00 | \$280,000.00 |
| 4 | 69 | 250 | 17250 | \$25.00 | \$431,250.00 |
| 5 | 79 | 250 | 19750 | \$25.00 | \$493,750.00 |
| 6 | 89 | 300 | 26700 | \$25.00 | \$667,500.00 |
| 7 | 16 | 300 | 4800 | \$25.00 | \$120,000.00 |
| Total | 394 | | 96700 | | \$2,417,500.00 |

| Rock Riffle Grade Control | | | | | |
|----------------------------------|---------------------|------------------------|----------------------|----------------------------|-------------------|
| Chapter | Rock Riffles | Average Tonnage | Ave. Cost Ton | Average Cost/Riffle | Total Cost |
| 1 | 57 | 175 | \$30.00 | \$5,250.00 | \$299,250.00 |
| 2 | 69 | 175 | \$30.00 | \$5,250.00 | \$362,250.00 |
| 3 | 46 | 200 | \$30.00 | \$6,000.00 | \$276,000.00 |
| 4 | 62 | 235 | \$30.00 | \$7,050.00 | \$437,100.00 |
| 5 | 63 | 235 | \$30.00 | \$7,050.00 | \$444,150.00 |
| 6 | 61 | 325 | \$30.00 | \$9,750.00 | \$594,750.00 |
| 7 | n/a | n/a | | | |
| Total | 358 | | | | \$2,413,500.00 |

Table 3 Treatment Recommendations for North Fork Kaskaskia River

North Fork Kaskaskia Chapter 1

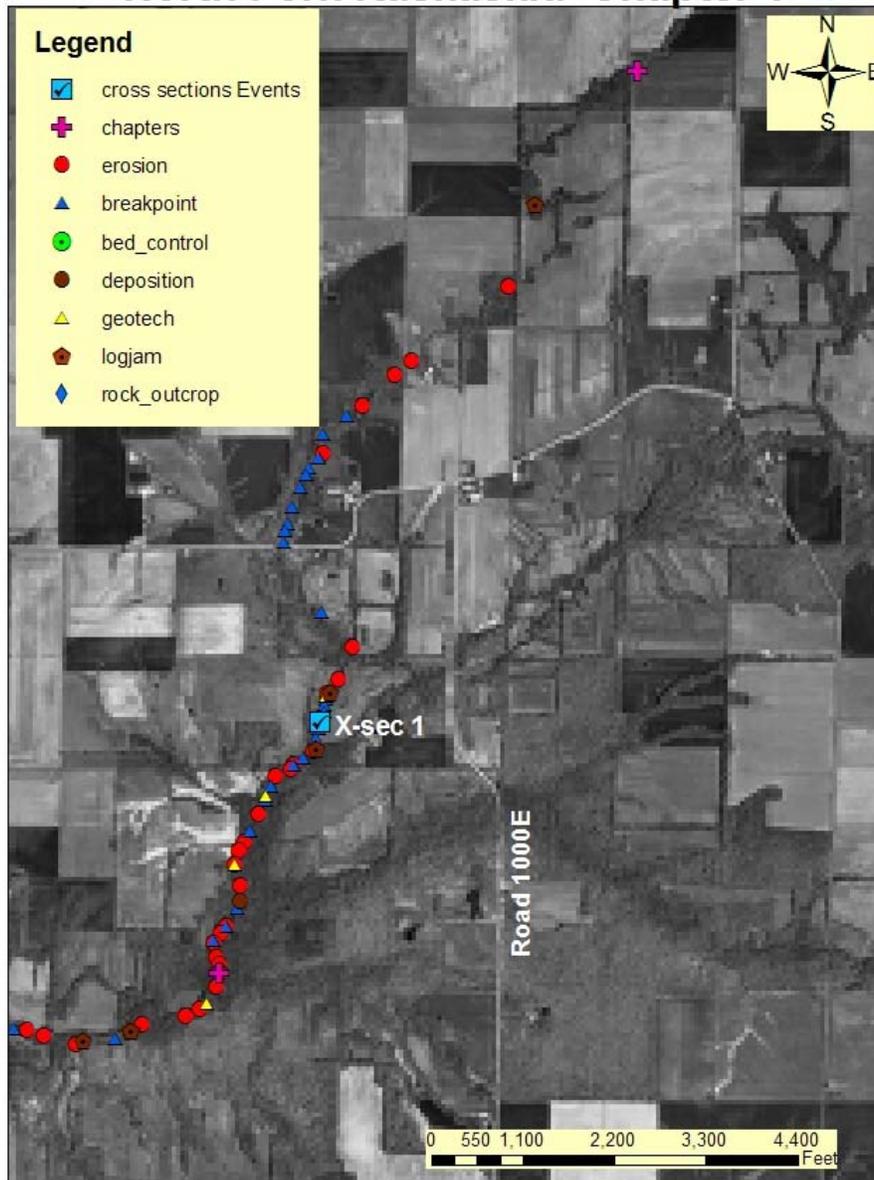


Fig. 9 Chapter 1

North Fork Kaskaskia Chapter 2

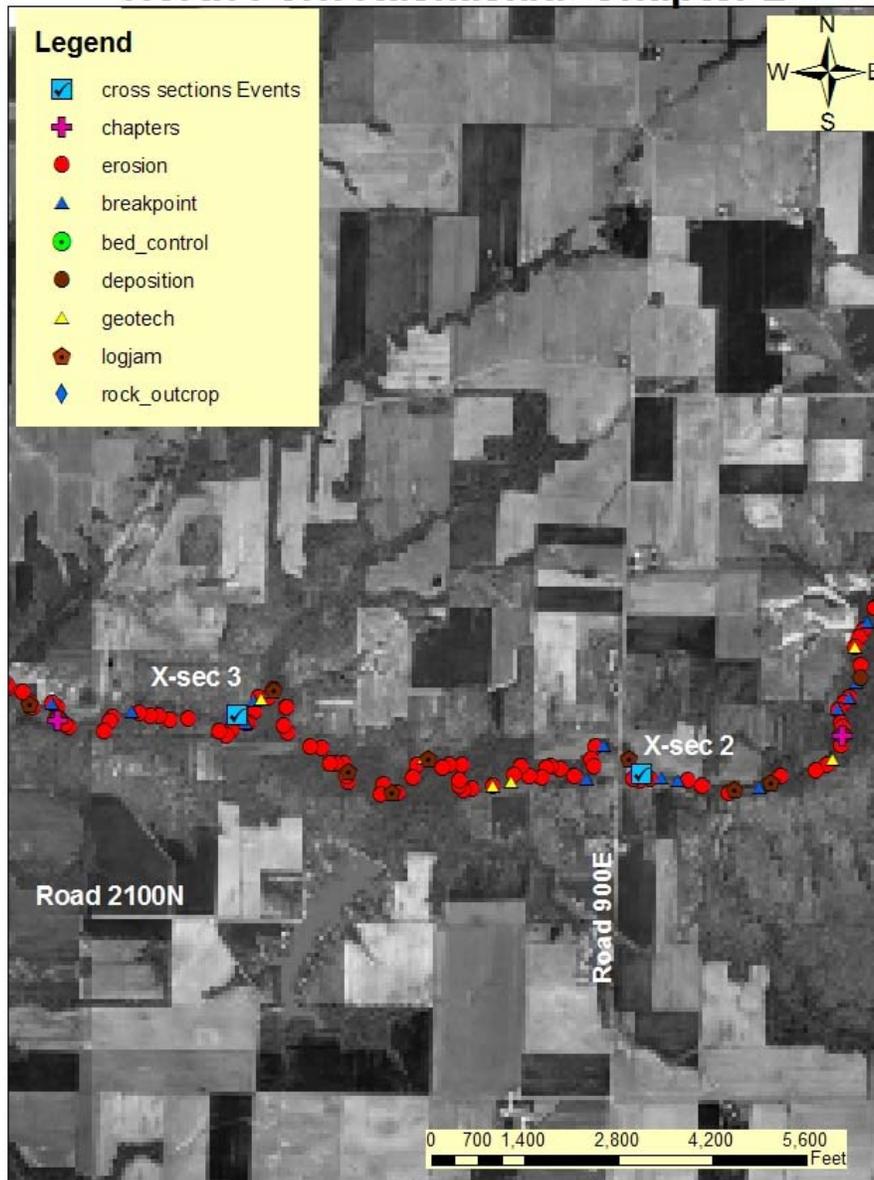


Figure 10 Chapter 2

North Fork Kaskaskia Chapter 3

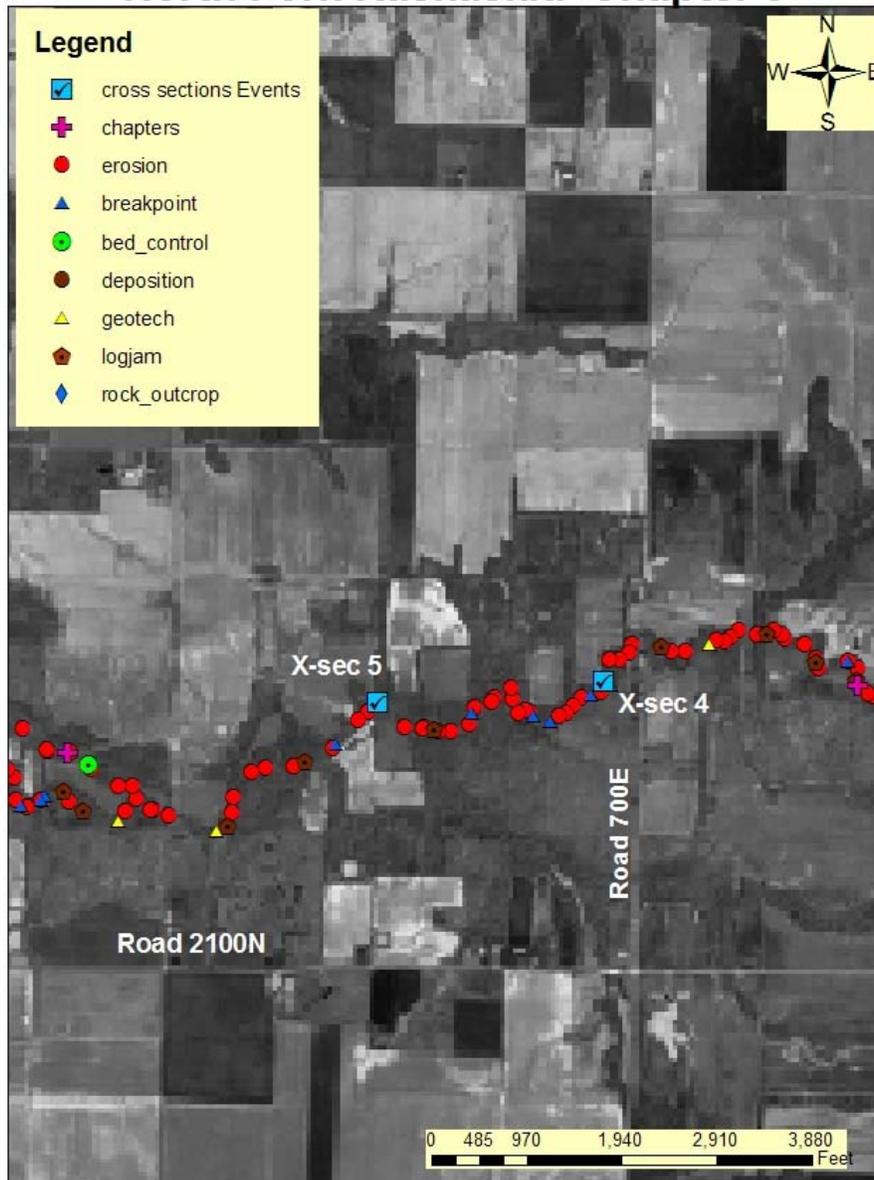


Fig. 11 Chapter 3

North Fork Kaskaskia Chapter 4

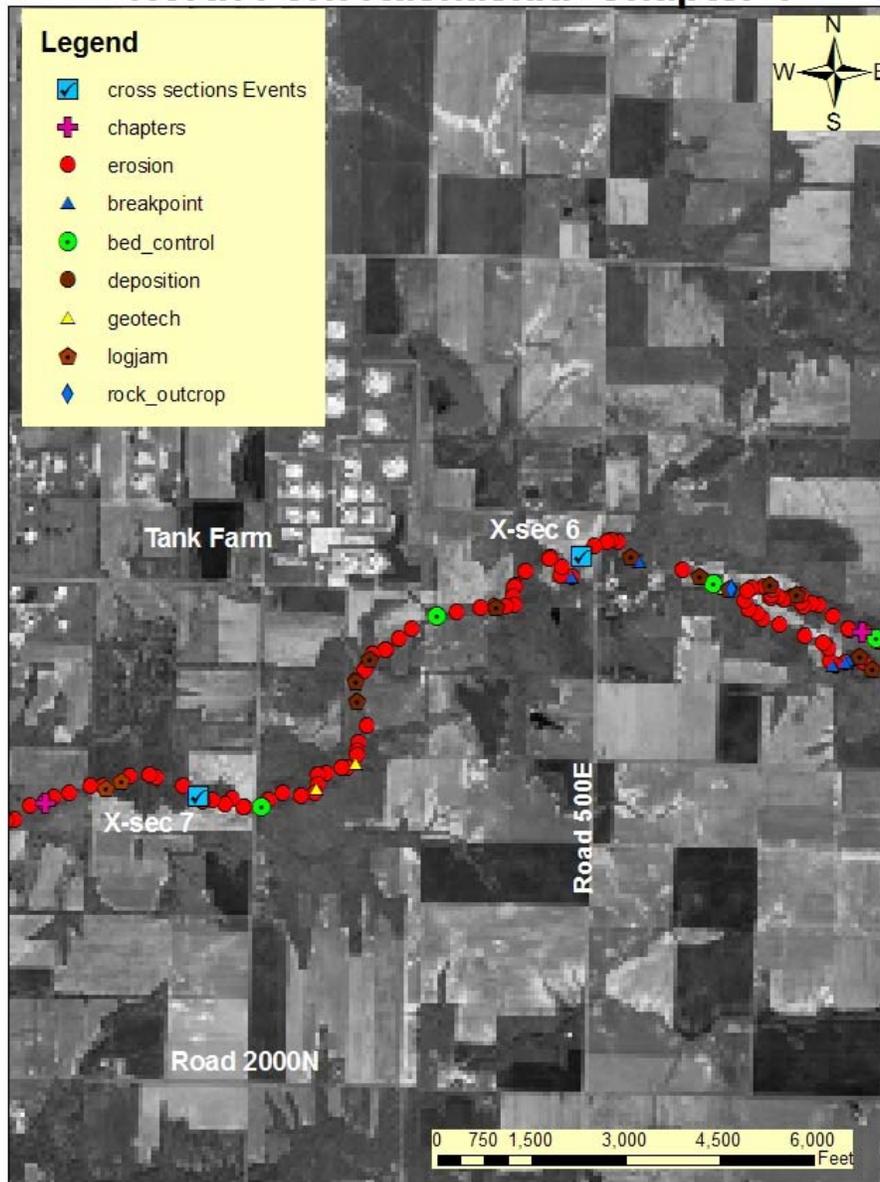


Fig. 12 Chapter 4

North Fork Kaskaskia Chapter 5

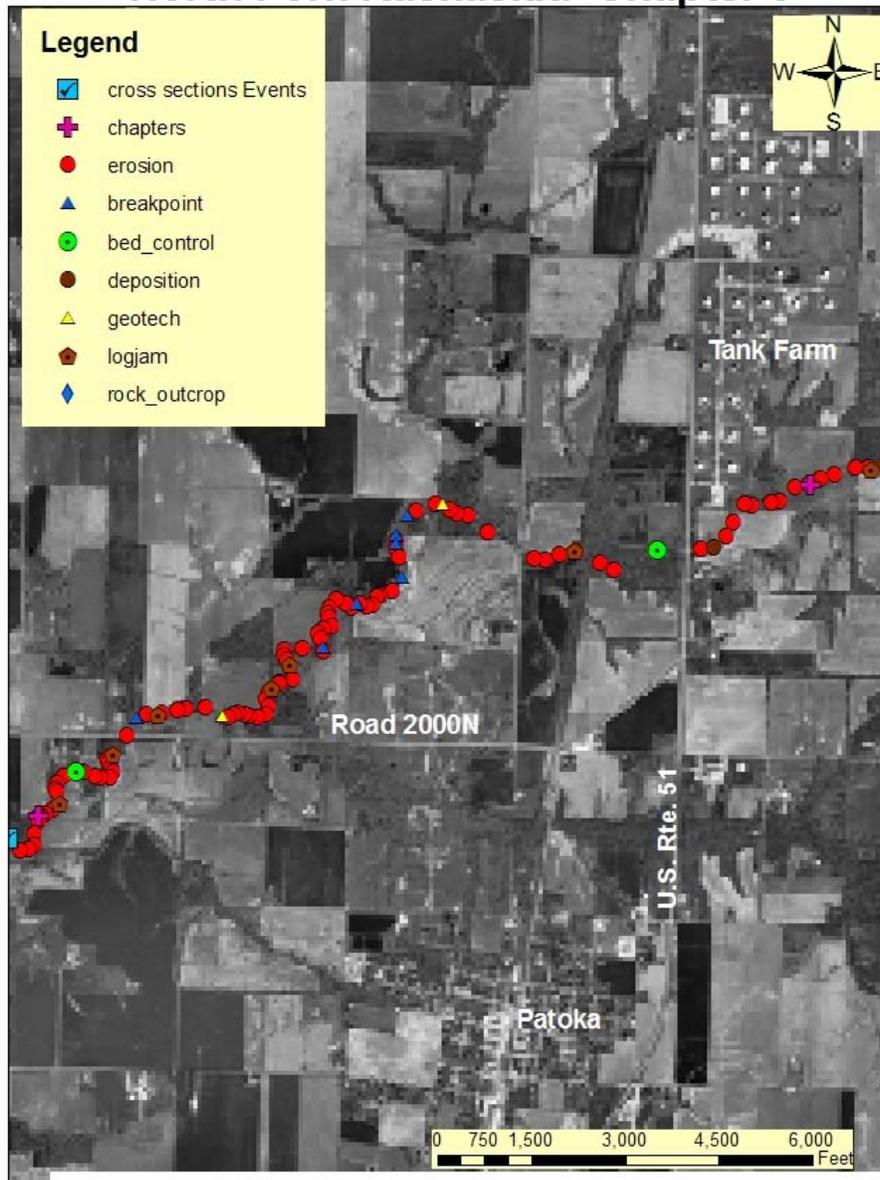


Fig. 13 Chapter 5

North Fork Kaskaskia Chapter 6

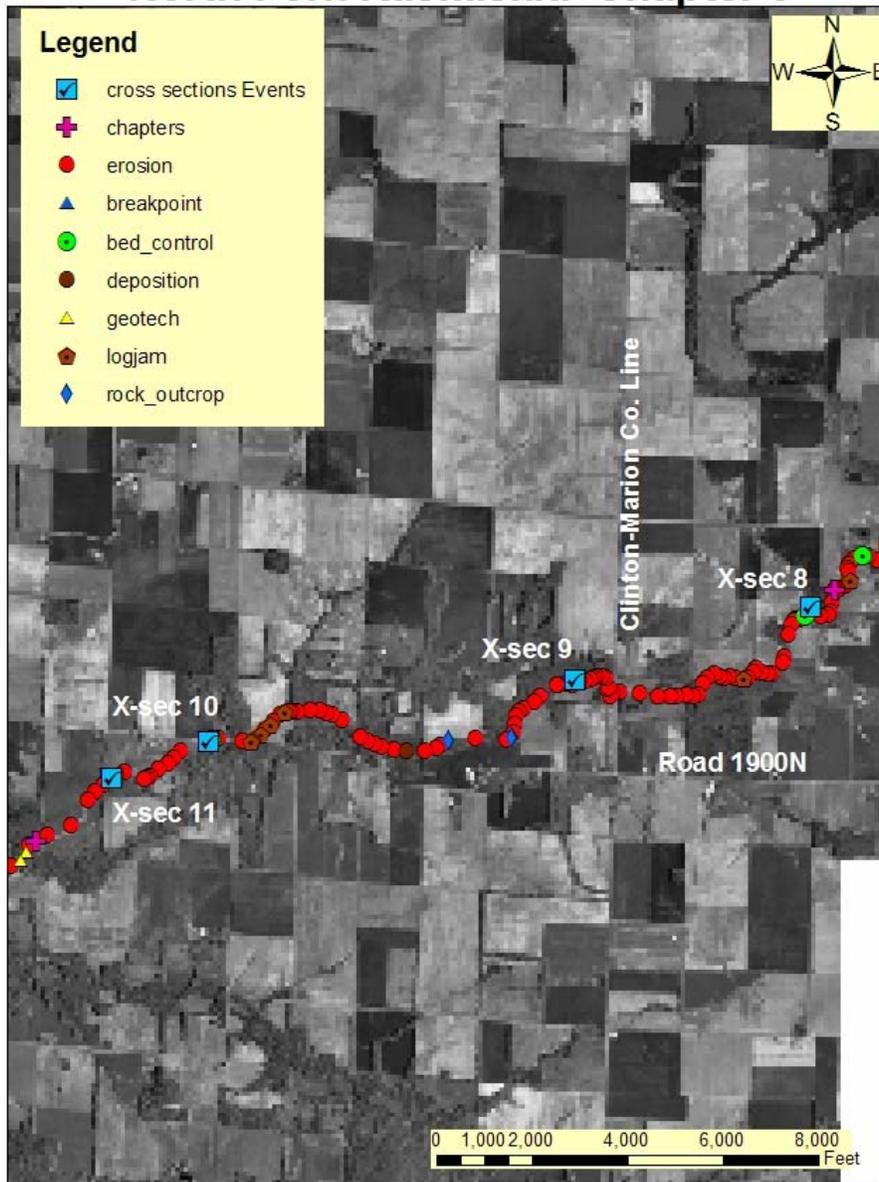


Fig. 14 Chapter 6

North Fork Kaskaskia Chapter 7

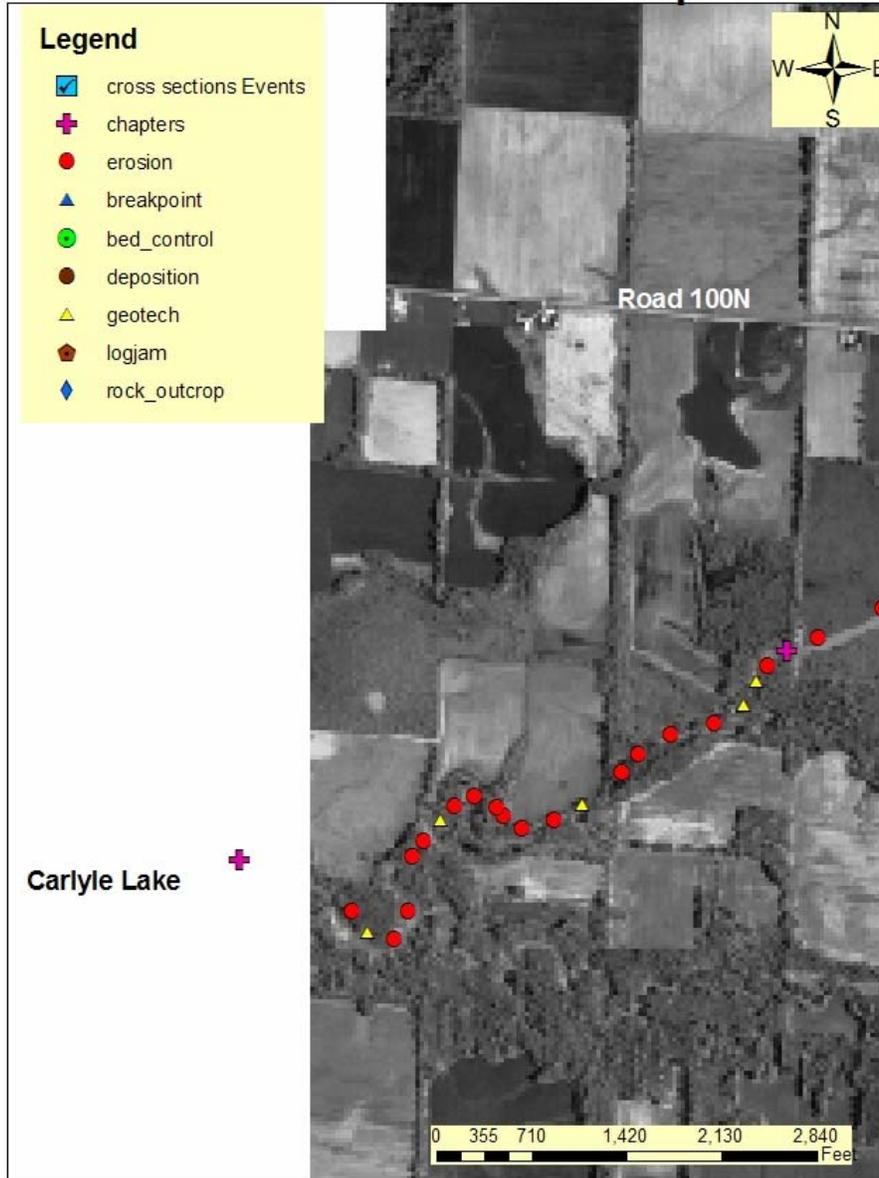


Fig. 15 Chapter 7

APPENDIX A

CROSS SECTION DATA

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Fayette T. R. Sec.
Date 9/15/2005 **By** Wayne Kinney
Stream Name North Fork Kaskaskia **UTM Coord.** E 329699 N4295973
Landowner Name Xsec 1
Drainage Area 15.3 sq. mi.

Regional Curve Predictions:

| | | | | |
|---------------------|-------|---------|----------------------|-------------|
| Bankfull dimensions | Width | 43 ft. | Cross Sectional Area | 143 sq. ft. |
| | Depth | 3.3 ft. | | |

Reference Stream Gage:

| | | | | |
|-------------------------------------|---------------|-----------|---------------------|----------|
| Hurricane Creek near Mulberry Grove | Station No. | 05592800 | Gage Q ₂ | 8240 cfs |
| Fayette County, IL | Drainage Area | 152 sq.mi | Regression Q | 4290 cfs |

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

| | | |
|---|---------------------------|---------------------------------------|
| Valley Slope: 6.7 ft./mi. (user-entered) | Regression Q ₂ | 747 cfs |
| ft./mi (from worksheet) | Adjusted Q ₂ | 1436 cfs |
| 0.0013 ft./ft. | Rainfall | 3.30 in (2 yr, 24 hr) |
| Regional Factor | 1.057 | Typical Range for Bankfull Discharge: |
| | | 570 to 1150 cfs |

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" 0.04

| | | |
|---------------------------|---|--|
| <i>Basic Field Data:</i> | Stream Length | <input type="text"/> ft. |
| Bankfull Width | Valley Length | <input type="text"/> ft. |
| Mean Bankfull Depth | Contour Interval | <input type="text"/> feet <input type="text"/> |
| Width/Depth Ratio | Estimated Sinuosity | <input type="text"/> |
| Max. Bankfull Depth | <i>Channel Slope:</i> | Bankfull Q from: |
| Width at twice max. depth | Surveyed: 0.00093 ft./ft. | Cross-Section 482 cfs |
| (13.0 ft.) | Estimated: <input type="text"/> ft./ft. | Basic field data 517 cfs |
| Entrenchment Ratio | Radius of Curvature (Rc) | Selected Q 500 cfs |
| 27.78 | Rc/Bankfull width: | 0.00 |

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft/sec.)

| | | |
|--|---|---------------|
| Bedload: D ₉₀ 1 <input type="text"/> in. | Velocity required to move D ₉₀ : | 2.1 ft./sec. |
| D ₅₀ <input type="text"/> in. | Velocity from Cross-Section data: | 2.92 ft./sec. |
| GOAL: Develop confidence by matching velocities from different sources. | Velocity from basic field data: | 3.13 ft./sec. |
| | Velocity from selected Q: | 3.0 ft./sec. |

Channel Evolution Stage III **Stream Type (Rosgen)**

Notes

32.7 cfs/sq. mile

Natural Open Channel Flow

Project: Xsec 1
 Assisted by: Wayne Kinney
 Date: 9/15/2005
 Channel Slope (**S**): 0.000930 ft/ft
 Manning's **n**: 0.040
 Flow Depth: 6.5 ft

$$Q = \frac{1.486}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

assuming uniform, steady flow

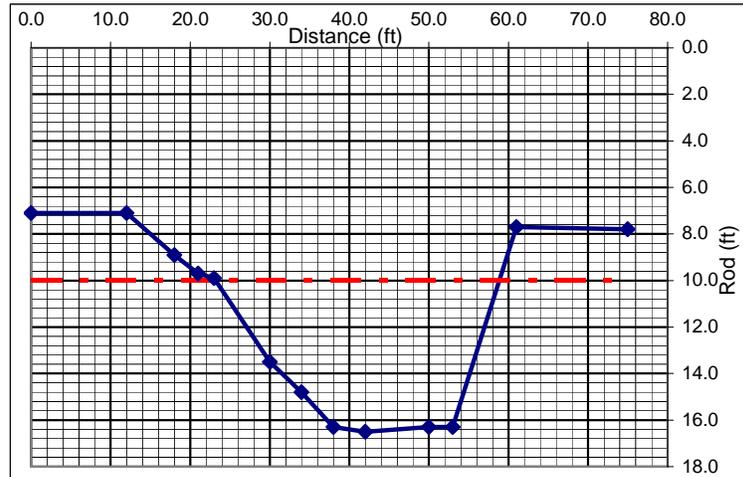
[back to I&E form](#)

Clear Cells

Survey Data:

| Rod (ft) | Distance (ft) |
|----------|---------------|
| 7.1 | 0.0 |
| 7.1 | 12.0 |
| 8.9 | 18.0 |
| 9.7 | 21.0 |
| 9.9 | 23.0 |
| 13.5 | 30.0 |
| 14.8 | 34.0 |
| 16.3 | 38.0 |
| 16.5 | 42.0 |
| 16.30 | 50 |
| 16.30 | 53 |
| 7.70 | 61 |
| 7.80 | 75 |

| | Trial Depth 2 | Trial Depth 3 |
|------------------------------------|---------------|---------------|
| Selected Flow Depth: | 6.5 ft | 8.8 |
| Channel Flow (Q): | 482.2 cfs | 733.9 |
| Channel Velocity: | 2.9 ft/sec | 2.8 |
| Cross-Sectional Area (A): | 164.9 sq.ft. | 261.9 |
| Hydraulic Radius (R): | 4.1 ft | 3.9 |



COMMENTS:

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Marion T. R. Sec.
Date 9/15/2005 **By** Wayne Kinney
Stream Name North Fork Kaskaskia **UTM Coord.**
Landowner Name X-sec 2
Drainage Area 19.17 sq. mi.

Regional Curve Predictions:

| | | | | |
|---------------------|-------|---------|----------------------|-------------|
| Bankfull dimensions | Width | 47 ft. | Cross Sectional Area | 167 sq. ft. |
| | Depth | 3.5 ft. | | |

Reference Stream Gage:

| | | | | | |
|------|----------------------|---------------|---|---------------------|---|
| none | <input type="text"/> | Station No. | - | Gage Q ₂ | - |
| 0 | - | Drainage Area | - | Regression Coef. | - |

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

| | | |
|--|---------------------------------------|----------------|
| Valley Slope: 6.7 ft./mi. (user-entered) | Regression Q ₂ | 966 cfs |
| <input type="text"/> ft./mi (from worksheet) | Adjusted Q ₂ | - |
| 0.0013 ft./ft. Rainfall 3.40 in (2 yr, 24 hr) | Typical Range for Bankfull Discharge: | 380 to 780 cfs |
| Regional Factor 1.057 | | |

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" 0.04

| | | |
|--|---|--|
| <i>Basic Field Data:</i> | Stream Length | <input type="text"/> ft. |
| Bankfull Width 35 ft. | Valley Length | <input type="text"/> ft. |
| Mean Bankfull Depth 4.79 ft. | Contour Interval | <input type="text"/> feet <input type="text"/> |
| Width/Depth Ratio 7.31 | Estimated Sinuosity | <input type="text"/> |
| Max. Bankfull Depth 6.3 ft. | <i>Channel Slope:</i> | Bankfull Q from: |
| Width at twice max. depth 800 ft. (12.6 ft.) | Surveyed: 0.00093 ft./ft. | Cross-Section 502 cfs |
| Entrenchment Ratio 22.86 | Estimated: <input type="text"/> ft./ft. | Basic field data 541 cfs |
| | Radius of Curvature (Rc) <input type="text"/> ft. | Selected Q 522 cfs |
| | Rc/Bankfull width: 0.00 | |

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft./sec.)

| | | |
|--|---|---------------|
| Bedload: D ₉₀ 1 in. | Velocity required to move D ₉₀ : | 2.1 ft./sec. |
| D ₅₀ <input type="text"/> in. | Velocity from Cross-Section data: | 3.00 ft./sec. |
| GOAL: Develop confidence by matching velocities from different sources. | Velocity from basic field data: | 3.23 ft./sec. |
| | Velocity from selected Q: | 3.1 ft./sec. |

Channel Evolution Stage III **Stream Type (Rosgen)**

Notes

27.2 cfs/sq. mile

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Marion T. R. Sec.
 Date **9/15/2005** By **Wayne Kinney**
 Stream Name **North Fork Kaskaskia** UTM Coord. **E326571 N4295146**
 Landowner Name **Xsec 3**
 Drainage Area **21.61** sq. mi.

Regional Curve Predictions:

| | | | | |
|---------------------|-------|----------------|----------------------|--------------------|
| Bankfull dimensions | Width | 50 ft. | Cross Sectional Area | 181 sq. ft. |
| | Depth | 3.7 ft. | | |

Reference Stream Gage:

| | | | | |
|---------------------------|---------------|----------|---------------------|----------|
| none <input type="text"/> | Station No. | - | Gage Q ₂ | - |
| 0 | Drainage Area | - | Regression | - |

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

| | | |
|--|---------------------------------------|-----------------------|
| Valley Slope: 6.2 ft./mi. (user-entered) | Regression Q ₂ | 1023 cfs |
| 0.0012 ft./ft. | Adjusted Q ₂ | - |
| Rainfall 3.40 in (2 yr, 24 hr) | Typical Range for Bankfull Discharge: | 400 to 820 cfs |
| Regional Factor 1.057 | | |

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" **0.04**

| | | |
|---------------------|----------------------|---------------------------|
| Stream Length | <input type="text"/> | ft. |
| Valley Length | <input type="text"/> | ft. |
| Contour Interval | <input type="text"/> | feet <input type="text"/> |
| Estimated Sinuosity | <input type="text"/> | |

Basic Field Data:

| | |
|--------------------------------------|-----------------|
| Bankfull Width | 41 ft. |
| Mean Bankfull Depth | 4.32 ft. |
| Width/Depth Ratio | 9.49 |
| Max. Bankfull Depth | 7.2 ft. |
| Width at twice max. depth (14.4 ft.) | 1000 ft. |
| Entrenchment Ratio | 24.39 |

Channel Slope:

| | | |
|------------|------------------------|-------------------------------------|
| Surveyed: | 0.00093 ft./ft. | Bankfull Q from: |
| Estimated: | <input type="text"/> | Cross-Section 511 cfs |
| | | Basic field data 534 cfs |
| | | Selected Q 523 cfs |

Radius of Curvature (Rc) ft.
Rc/Bankfull width: **0.00**

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft/sec.)

| | | |
|--|---|----------------------|
| Bedload: D ₉₀ 1 in. | Velocity required to move D ₉₀ : | 2.1 ft./sec. |
| D ₅₀ <input type="text"/> in. | Velocity from Cross-Section data: | 2.89 ft./sec. |
| GOAL: Develop confidence by matching velocities from different sources. | Velocity from basic field data: | 3.01 ft./sec. |
| | Velocity from selected Q: | 3.0 ft./sec. |

Channel Evolution Stage III Stream Type (Rosgen)

Notes

24.2 cfs/ sq. mile

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Marion T. R. Sec.
Date 9/15/2005 By Wayne Kinney
Stream Name East Fork Kaskaskia River **UTM Coord.** E324966 N4295138
Landowner Name xsec 4
Drainage Area 24.46 sq. mi.

Regional Curve Predictions:

| | | | | |
|---------------------|-------|---------|----------------------|-------------|
| Bankfull dimensions | Width | 52 ft. | Cross Sectional Area | 197 sq. ft. |
| | Depth | 3.8 ft. | | |

Reference Stream Gage:

| | | | | |
|---------------------------|---------------|---|------------------------|---|
| none <input type="text"/> | Station No. | - | Gage Q ₂ | - |
| 0 | Drainage Area | - | Regression Coefficient | - |

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

| | | |
|---|---------------------------|---------------------------------------|
| Valley Slope: 6.2 ft./mi. (user-entered) | Regression Q ₂ | 1128 cfs |
| <input type="text"/> ft./mi (from worksheet) | Adjusted Q ₂ | - |
| 0.0012 ft./ft. | Rainfall | 3.40 in (2 yr, 24 hr) |
| Regional Factor | 1.057 | Typical Range for Bankfull Discharge: |
| | | 450 to 910 cfs |

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" 0.04

| | | |
|---------------------------|---------------------|--|
| Basic Field Data: | Stream Length | <input type="text"/> ft. |
| Bankfull Width | Valley Length | <input type="text"/> ft. |
| Mean Bankfull Depth | Contour Interval | <input type="text"/> feet <input type="text"/> |
| Width/Depth Ratio | Estimated Sinuosity | <input type="text"/> |
| Max. Bankfull Depth | Channel Slope: | |
| Width at twice max. depth | Surveyed: | 0.00093 ft./ft. |
| (12.6 ft.) | Estimated: | <input type="text"/> ft./ft. |
| Entrenchment Ratio | Bankfull Q from: | |
| 18.60 | Cross-Section | 552 cfs |
| Radius of Curvature (Rc) | Basic field data | 580 cfs |
| Rc/Bankfull width: | Selected Q | 566 cfs |
| 0.00 | | |

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft/sec.)

| | | | |
|---|--|---|---------------|
| Bedload: D ₉₀ | 1 <input type="text"/> in. | Velocity required to move D ₉₀ : | 2.1 ft./sec. |
| | D ₅₀ <input type="text"/> in. | Velocity from Cross-Section data: | 2.91 ft./sec. |
| GOAL: Develop confidence by matching velocities from different sources. | | Velocity from basic field data: | 3.06 ft./sec. |
| | | Velocity from selected Q: | 3.0 ft./sec. |

Channel Evolution Stage II **Stream Type (Rosgen)**

Notes

23.1 cfs/sq. mile

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

| | | | | |
|----------------|---------------------------|-------------|------------------|------|
| County | Marion | T. | R. | Sec. |
| Date | 9/15/2005 | By | Wayne Kinney | |
| Stream Name | East Fork Kaskaskia River | UTM Coord. | E324264 N4295075 | |
| Landowner Name | xsec5 | | | |
| Drainage Area | 27.08 sq. mi. | Clear Cells | | |

Regional Curve Predictions:

| | | | | |
|---------------------|-------|---------|----------------------|-------------|
| Bankfull dimensions | Width | 54 ft. | Cross Sectional Area | 211 sq. ft. |
| | Depth | 3.9 ft. | | |

Reference Stream Gage:

| | | | | |
|-----------------------------------|---------------|---|---------------------|---|
| none | Station No. | - | Gage Q ₂ | - |
| 0 | Drainage Area | - | Regression | - |
| REFERENCE STREAM DATA ONLY | | | | |

USGS Flood-Peak Discharge Predictions:

| | | | |
|----------------------|----------------------------|---------------------------------------|-----------------------|
| <u>Valley Slope:</u> | 6.2 ft./mi. (user-entered) | Regression Q ₂ | 1223 cfs |
| | ft./mi (from worksheet) | Rainfall | 3.40 in (2 yr, 24 hr) |
| | 0.0012 ft./ft. | Regional Factor | 1.057 |
| | | Adjusted Q ₂ | - |
| | | Typical Range for Bankfull Discharge: | |
| | | 480 to 980 cfs | |

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" 0.04

| | | |
|--------------------------------------|------------------------------|--------------------------|
| <i>Basic Field Data:</i> | Stream Length | ft. |
| Bankfull Width | Valley Length | ft. |
| Mean Bankfull Depth | Contour Interval | feet |
| Width/Depth Ratio | Estimated Sinuosity | |
| Max. Bankfull Depth | <i>Channel Slope:</i> | Bankfull Q from: |
| Width at twice max. depth (11.2 ft.) | Surveyed: 0.00093 ft./ft. | Cross-Section 610 cfs |
| Entrenchment Ratio 16.67 | Estimated: ft./ft. | Basic field data 637 cfs |
| | Radius of Curvature (Rc) ft. | Selected Q 624 cfs |
| | Rc/Bankfull width: 0.00 | |

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft/sec.)

| | | | |
|---|-------|---|---------------|
| Bedload: D ₉₀ | 1 in. | Velocity required to move D ₉₀ : | 2.1 ft./sec. |
| D ₅₀ | | Velocity from Cross-Section data: | 2.91 ft./sec. |
| GOAL: Develop confidence by matching velocities from different sources. | | Velocity from basic field data: | 3.04 ft./sec. |
| | | Velocity from selected Q: | 3.0 ft./sec. |

Channel Evolution Stage IV Stream Type (Rosgen)

Notes

23.0 cfs/sq. mile

Natural Open Channel Flow

Project:
 Assisted by:
 Date:
 Channel Slope (S): ft/ft
 Manning's n:
 Flow Depth: ft

$$Q = \frac{1.486}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

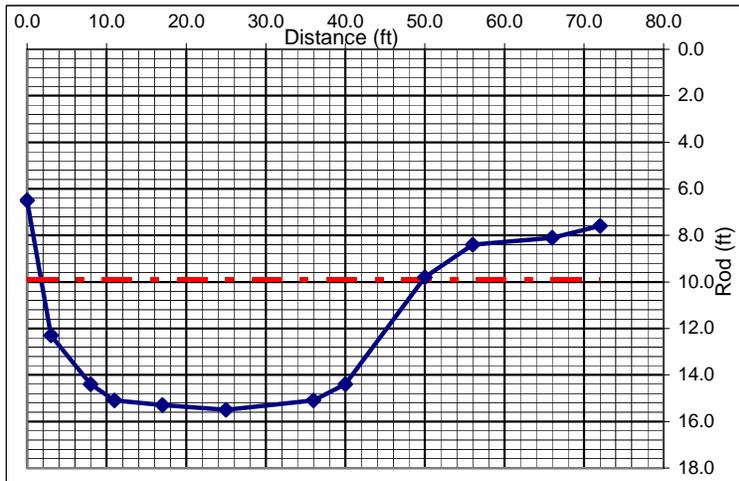
assuming uniform, steady flow

[back to I&E form](#)

Survey Data:

| Rod (ft) | Distance (ft) |
|----------|---------------|
| 6.5 | 0.0 |
| 12.3 | 3.0 |
| 14.4 | 8.0 |
| 15.1 | 11.0 |
| 15.3 | 17.0 |
| 15.5 | 25.0 |
| 15.1 | 36.0 |
| 14.4 | 40.0 |
| 9.8 | 50.0 |
| 8.40 | 56 |
| 8.10 | 66 |
| 7.60 | 72 |

| | Trial Depth 2 | Trial Depth 3 |
|---------------------------|---------------|---------------|
| Selected Flow Depth: | 5.6 ft | 7.9 |
| Channel Flow (Q): | 610.3 cfs | 1,041.2 |
| Channel Velocity: | 2.9 ft/sec | 3.1 |
| Cross-Sectional Area (A): | 209.9 sq.ft. | 339.2 |
| Hydraulic Radius (R): | 4.1 ft | 4.5 |



COMMENTS:

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Marion T. R. Sec.
 Date 9/15/2005 By Wayne Kinney
 Stream Name East Fork Kaskaskia River UTM Coord. E321941 N4295285
 Landowner Name xsec 6
 Drainage Area 34.68 sq. mi.

Regional Curve Predictions:

| | | | | |
|---------------------|-------|----------------|----------------------|--------------------|
| Bankfull dimensions | Width | <u>59</u> ft. | Cross Sectional Area | <u>249</u> sq. ft. |
| | Depth | <u>4.2</u> ft. | | |

Reference Stream Gage:

| | | | | | |
|------|----------------------|---------------|----------|------------------------|----------|
| none | <input type="text"/> | Station No. | <u>-</u> | Gage Q ₂ | <u>-</u> |
| 0 | - | Drainage Area | <u>-</u> | Regression Coefficient | <u>-</u> |

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

| | | | |
|----------------------|---|---|------------------------------|
| Valley Slope: | <u>5.9</u> ft./mi. (user-entered) | Regression Q ₂ | <u>1452</u> cfs |
| | <u> </u> ft./mi (from worksheet) | Adjusted Q ₂ | <u>-</u> |
| | <u>0.0011</u> ft./ft. | Rainfall | <u>3.40</u> in (2 yr, 24 hr) |
| | | Regional Factor | <u>1.057</u> |
| | | Typical Range for Bankfull Discharge: <u>580</u> to <u>1170</u> cfs | |

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" 0.04

| | | |
|---------------------------|---|--|
| Basic Field Data: | Stream Length | <input type="text"/> ft. |
| Bankfull Width | Valley Length | <input type="text"/> ft. |
| Mean Bankfull Depth | Contour Interval | <input type="text"/> feet <input type="text"/> |
| Width/Depth Ratio | Estimated Sinuosity | <input type="text"/> |
| | | |
| Max. Bankfull Depth | Channel Slope: | Bankfull Q from: |
| Width at twice max. depth | Surveyed: <u>0.00052</u> ft./ft. | <u>Cross-Section</u> <u>566</u> cfs |
| (16.4 ft.) | Estimated: <input type="text"/> ft./ft. | Basic field data <u>624</u> cfs |
| Entrenchment Ratio | Radius of Curvature (Rc) | Selected Q <u>595</u> cfs |
| <u>26.32</u> | <input type="text"/> ft. | |
| | Rc/Bankfull width: <u>0.00</u> | |

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft/sec.)

| | | | |
|---|--|---|----------------------|
| Bedload: D ₉₀ | <u>1</u> <input type="text"/> in. | Velocity required to move D ₉₀ : | <u>2.1</u> ft./sec. |
| | D ₅₀ <input type="text"/> in. | Velocity from Cross-Section data: | <u>2.52</u> ft./sec. |
| GOAL: Develop confidence by matching velocities from different sources. | | Velocity from basic field data: | <u>2.78</u> ft./sec. |
| | | Velocity from selected Q: | <u>2.6</u> ft./sec. |

Channel Evolution Stage II Stream Type (Rosgen)

Notes

17.2 cfs/sq. mile

Natural Open Channel Flow

Project:
 Assisted by:
 Date:
 Channel Slope (S): ft/ft
 Manning's n:
 Flow Depth: ft

$$Q = \frac{1.486}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

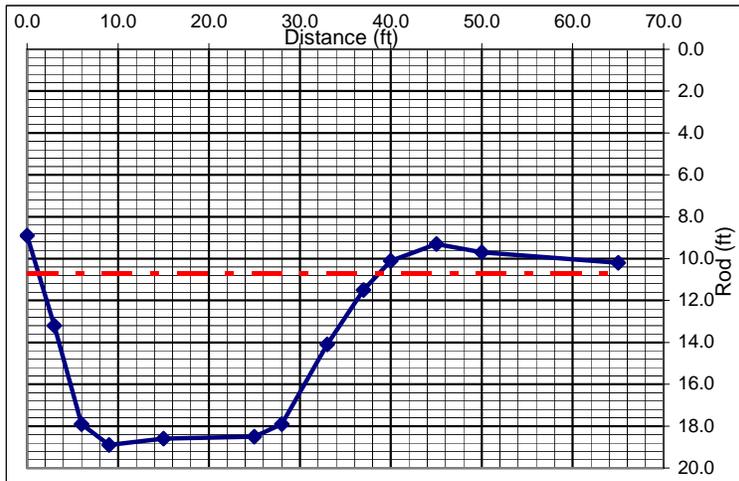
assuming uniform, steady flow

[back to I&E form](#)

Survey Data:

| Rod (ft) | Distance (ft) |
|----------|---------------|
| 8.9 | 0.0 |
| 13.2 | 3.0 |
| 17.9 | 6.0 |
| 18.9 | 9.0 |
| 18.6 | 15.0 |
| 18.5 | 25.0 |
| 17.9 | 28.0 |
| 14.1 | 33.0 |
| 11.5 | 37.0 |
| 10.10 | 40 |
| 9.30 | 45 |
| 9.70 | 50 |
| 10.20 | 65 |

| | Trial Depth 2 | Trial Depth 3 |
|---------------------------|---------------|---------------|
| Selected Flow Depth: | 8.2 ft | 9.6 |
| Channel Flow (Q): | 566.3 cfs | 606.2 |
| Channel Velocity: | 2.5 ft/sec | 2.1 |
| Cross-Sectional Area (A): | 224.7 sq.ft. | 294.6 |
| Hydraulic Radius (R): | 5.1 ft | 3.8 |



COMMENTS:

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Marion T. R. Sec.
Date 9/15/2005 **By** Wayne Kinney
Stream Name East Fork Kaskaskia River **UTM Coord.** E320087 N4294120
Landowner Name Xsec 7
Drainage Area 36.83 sq. mi.

Regional Curve Predictions:
Bankfull dimensions Width 61 ft. Cross Sectional Area 259 sq. ft.
 Depth 4.3 ft.

Reference Stream Gage:
 none Station No. - Gage Q₂ -
 Drainage Area - Regression -
 0 - **REFERENCE STREAM DATA ONLY**

USGS Flood-Peak Discharge Predictions:
Valley Slope: 5.1 ft./mi. (user-entered) Regression Q₂ 1419 cfs
 ft./mi. (from worksheet) Rainfall 3.40 in (2 yr, 24 hr) Adjusted Q₂ -
 0.0010 ft./ft. Regional Factor 1.057 Typical Range for Bankfull Discharge:
 560 to 1140 cfs

Local Stream Morphology:
Channel Description: (c) Clean, winding, some pools and shoals
Manning's "n" 0.04
Basic Field Data: Stream Length ft.
 Bankfull Width 47 ft. Valley Length ft.
 Mean Bankfull Depth 5.45 ft. Contour Interval feet
 Width/Depth Ratio 8.62 Estimated Sinuosity
Channel Slope: Max. Bankfull Depth 8.1 ft. Bankfull Q from:
 Width at twice max. depth 800 ft. Surveyed: 0.00052 ft./ft. Cross-Section 642 cfs
 (16.2 ft.) Estimated: ft./ft. Basic field data 674 cfs
 Entrenchment Ratio 17.02 Radius of Curvature (Rc) ft. Selected Q 658 cfs
 Rc/Bankfull width: 0.00

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft./sec.)
Bedload: D₉₀ 1 in. Velocity required to move D₉₀: 2.1 ft./sec.
 D₅₀ in. Velocity from Cross-Section data: 2.51 ft./sec.
GOAL: Develop confidence by matching velocities from different sources. Velocity from basic field data: 2.63 ft./sec.
 Velocity from selected Q: 2.6 ft./sec.

Channel Evolution Stage III **Stream Type (Rosgen)**

Notes
 17.9 cfs/sq. mi.

| Stream Stabilization I & E Form | | ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book | |
|--|----------------------------|---|---------------------------------------|
| County | Marion | T. | R. |
| Date | 9/15/2005 | By | Wayne Kinney |
| Stream Name | East Fork Kaskaskia River | UTM Coord. | E315439 N4292365 |
| Landowner Name | xsec 8 | | |
| Drainage Area | 51.33 sq. mi. | Clear Cells | |
| <i>Regional Curve Predictions:</i> | | | |
| Bankfull dimensions | Width | 69 ft. | Cross Sectional Area |
| | Depth | 4.7 ft. | 325 sq. ft. |
| <i>Reference Stream Gage:</i> | | | |
| none | Station No. | - | Gage Q ₂ |
| 0 | Drainage Area | - | Regression |
| | | | - |
| REFERENCE STREAM DATA ONLY | | | |
| <i>USGS Flood-Peak Discharge Predictions:</i> | | | |
| Valley Slope: | 4.7 ft./mi. (user-entered) | Regression Q ₂ | 1774 cfs |
| | ft./mi. (from worksheet) | Adjusted Q ₂ | - |
| 0.0009 ft./ft. | Rainfall | 3.40 in (2 yr, 24 hr) | |
| | Regional Factor | 1.057 | Typical Range for Bankfull Discharge: |
| | | | 700 to 1420 cfs |
| <i>Local Stream Morphology:</i> | | | |
| Channel Description: (c) Clean, winding, some pools and shoals | | | |
| Manning's "n" | 0.04 | Stream Length | ft. |
| <i>Basic Field Data:</i> | | Valley Length | ft. |
| Bankfull Width | 51 ft. | Contour Interval | feet |
| Mean Bankfull Depth | 5.88 ft. | Estimated Sinuosity | |
| Width/Depth Ratio | 8.67 | | |
| Max. Bankfull Depth | 8.4 ft. | Channel Slope: | Bankfull Q from: |
| Width at twice max. depth | 800 ft. | Surveyed: 0.00052 ft./ft. | Cross-Section 778 cfs |
| (16.8 ft.) | | Estimated: ft./ft. | Basic field data 830 cfs |
| Entrenchment Ratio | 15.69 | Radius of Curvature (Rc) | Selected Q 804 cfs |
| | | Rc/Bankfull width: | 0.00 |
| <i>Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft/sec.)</i> | | | |
| Bedload: | D ₉₀ 1 in. | Velocity required to move D ₉₀ : | 2.1 ft./sec. |
| | D ₅₀ in. | Velocity from Cross-Section data: | 2.59 ft./sec. |
| GOAL: Develop confidence by matching velocities from different sources. | | Velocity from basic field data: | 2.77 ft./sec. |
| | | Velocity from selected Q: | 2.7 ft./sec. |
| Channel Evolution Stage | III | Stream Type (Rosgen) | |
| Notes | | | |
| 15.7 cfs/sq. mile | | | |

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Marion T. R. Sec.

Date 9/15/2005 By Wayne Kinney

Stream Name East Fork Kaskaskia River UTM Coord. E313939 N4291900
 Landowner Name xsec 9

Drainage Area 54.33 sq. mi.

Regional Curve Predictions:
 Bankfull dimensions Width 71 ft. Cross Sectional Area 338 sq. ft.
 Depth 4.8 ft.

Reference Stream Gage:
 none Station No. - Gage Q₂ -
 Drainage Area - Regression -
 0 - **REFERENCE STREAM DATA ONLY**

USGS Flood-Peak Discharge Predictions:
Valley Slope: 4.7 ft./mi. (user-entered) Regression Q₂ 1855 cfs
 ft./mi (from worksheet) Rainfall 3.40 in (2 yr, 24 hr) Adjusted Q₂ -
0.0009 ft./ft. Regional Factor 1.057 Typical Range for Bankfull Discharge:
740 to 1490 cfs

Local Stream Morphology:
Channel Description: (c) Clean, winding, some pools and shoals
 Manning's "n" 0.04
Basic Field Data:
 Bankfull Width 53 ft. Stream Length ft.
 Mean Bankfull Depth 6.07 ft. Valley Length ft.
 Width/Depth Ratio 8.73 Contour Interval feet
 Estimated Sinuosity
 Channel Slope:
 Max. Bankfull Depth 9 ft. Surveyed: 0.00052 ft./ft. Bankfull Q from:
 Width at twice max. depth 1000 ft. Estimated: ft./ft. Cross-Section 856 cfs
 (18.0 ft.) Basic field data 910 cfs
 Selected Q 883 cfs
 Entrenchment Ratio 18.87 Radius of Curvature (Rc) ft.
 Rc/Bankfull width: 0.00

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft/sec.)
 Bedload: D₉₀ 1 in. Velocity required to move D₉₀: 2.1 ft./sec.
 D₅₀ in. Velocity from Cross-Section data: 2.66 ft./sec.
 GOAL: Develop confidence by matching velocities from different sources. Velocity from basic field data: 2.83 ft./sec.
 Velocity from selected Q: 2.7 ft./sec.

Channel Evolution Stage III Stream Type (Rosgen)

Notes
 16.3 cfs/sq. mile

Natural Open Channel Flow

Project: xsec 9
 Assisted by: Wayne Kinney
 Date: 9/15/2005
 Channel Slope (S): 0.000520 ft/ft
 Manning's n: 0.040
 Flow Depth: 9.0 ft

$$Q = \frac{1.486}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

assuming uniform, steady flow

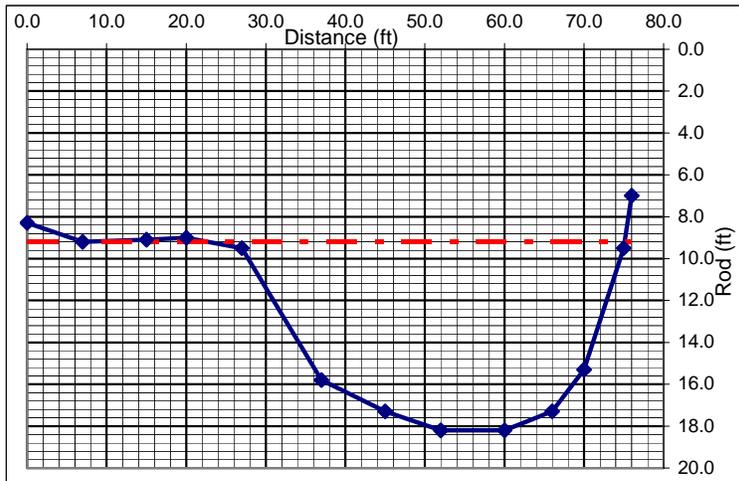
[back to I&E form](#)

Clear Cells

Survey Data:

| Rod (ft) | Distance (ft) |
|----------|---------------|
| 8.3 | 0.0 |
| 9.2 | 7.0 |
| 9.1 | 15.0 |
| 9.0 | 20.0 |
| 9.5 | 27.0 |
| 15.8 | 37.0 |
| 17.3 | 45.0 |
| 18.2 | 52.0 |
| 18.2 | 60.0 |
| 17.30 | 66 |
| 15.30 | 70 |
| 9.50 | 75 |
| 7.00 | 76 |

| | Trial Depth 2 | Trial Depth 3 |
|---------------------------|---------------|---------------|
| Selected Flow Depth: | 9.0 ft | 9.9 |
| Channel Flow (Q): | 855.5 cfs | 916.4 |
| Channel Velocity: | 2.7 ft/sec | 2.4 |
| Cross-Sectional Area (A): | 321.5 sq.ft. | 384.7 |
| Hydraulic Radius (R): | 5.6 ft | 4.7 |



COMMENTS:

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Marion T. R. Sec.

Date 9/15/2005 By Wayne Kinney

Stream Name East Fork Kaskaskia River UTM Coord. E311609 N4291507
 Landowner Name xsec 10

Drainage Area 57 sq. mi.

Regional Curve Predictions:

Bankfull dimensions Width 72 ft. Cross Sectional Area 349 sq. ft.
 Depth 4.8 ft.

Reference Stream Gage:

none Station No. - Gage Q₂ -
 Drainage Area - Regression -
 0 - REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

Valley Slope: 4.7 ft./mi. (user-entered) Regression Q₂ 1927 cfs
 ft./mi (from worksheet) Rainfall 3.40 in (2 yr, 24 hr) Adjusted Q₂ -
 0.0009 ft./ft. Regional Factor 1.057 Typical Range for Bankfull Discharge:
 770 to 1550 cfs

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" 0.04

Stream Length ft.
 Valley Length ft.
 Contour Interval feet

Basic Field Data:
 Bankfull Width 36 ft.
 Mean Bankfull Depth 5.81 ft.
 Width/Depth Ratio 6.20

Channel Slope:
 Surveyed: 0.00052 ft./ft. Bankfull Q from:
 Estimated: ft./ft. Cross-Section 490 cfs
 Basic field data 575 cfs
 Selected Q 533 cfs

Max. Bankfull Depth 7.8 ft.
 Width at twice max. depth 1000 ft.
 (15.6 ft.)

Entrenchment Ratio 27.78 Radius of Curvature (Rc) ft.
 Rc/Bankfull width: 0.00

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft./sec.)

Bedload: D₉₀ 1 in. Velocity required to move D₉₀: 2.1 ft./sec.
 D₅₀ in. Velocity from Cross-Section data: 2.34 ft./sec.

GOAL: Develop confidence by matching velocities from different sources.
 Velocity from basic field data: 2.75 ft./sec.
 Velocity from selected Q: 2.5 ft./sec.

Channel Evolution Stage III Stream Type (Rosgen)

Notes

9.4 cfs/sq. mile

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 2.05- modified 9/12/04 R.Book

County Marion T. R. Sec.
Date 9/15/2005 **By** Wayne Kinney
Stream Name East Fork Kaskaskia River **UTM Coord.** E310990 N4291279
Landowner Name xsec 11
Drainage Area 57.31 sq. mi.

Regional Curve Predictions:

| | | | | |
|---------------------|-------|---------|----------------------|-------------|
| Bankfull dimensions | Width | 72 ft. | Cross Sectional Area | 350 sq. ft. |
| | Depth | 4.8 ft. | | |

Reference Stream Gage:

| | | | | | |
|------|----------------------|---------------|---|------------------------|---|
| none | <input type="text"/> | Station No. | - | Gage Q ₂ | - |
| 0 | - | Drainage Area | - | Regression Coefficient | - |

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

| | | |
|---|---------------------------------------|-----------------|
| Valley Slope: 4.7 ft./mi. (user-entered) | Regression Q ₂ | 1935 cfs |
| <input type="text"/> ft./mi (from worksheet) | Adjusted Q ₂ | - |
| Rainfall 3.40 in (2 yr, 24 hr) | Typical Range for Bankfull Discharge: | 770 to 1550 cfs |
| 0.0009 ft./ft. Regional Factor 1.057 | | |

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" 0.04

| | | |
|---|---|--|
| Basic Field Data: | Stream Length | <input type="text"/> ft. |
| Bankfull Width 58 ft. | Valley Length | <input type="text"/> ft. |
| Mean Bankfull Depth 5.49 ft. | Contour Interval | <input type="text"/> feet <input type="text"/> |
| Width/Depth Ratio 10.56 | Estimated Sinuosity | <input type="text"/> |
| Max. Bankfull Depth 8 ft. | Channel Slope: | Bankfull Q from: |
| Width at twice max. depth 1000 ft. (16.0 ft.) | Surveyed: 0.00052 ft./ft. | Cross-Section 807 cfs |
| Entrenchment Ratio 17.24 | Estimated: <input type="text"/> ft./ft. | Basic field data 842 cfs |
| | Radius of Curvature (Rc) <input type="text"/> ft. | Selected Q 825 cfs |
| | Rc/Bankfull width: 0.00 | |

Bankfull Velocity Check: (typical Illinois streams will have average bankfull velocity between 3 and 5 ft./sec.)

| | | |
|---|---|---------------|
| Bedload: D ₉₀ 1 <input type="text"/> in. | Velocity required to move D ₉₀ : | 2.1 ft./sec. |
| D ₅₀ <input type="text"/> in. | Velocity from Cross-Section data: | 2.53 ft./sec. |
| GOAL: Develop confidence by matching velocities from different sources. | Velocity from basic field data: | 2.64 ft./sec. |
| | Velocity from selected Q: | 2.6 ft./sec. |

Channel Evolution Stage IV **Stream Type (Rosgen)**

Notes

14.4 cfs/sq. mile

