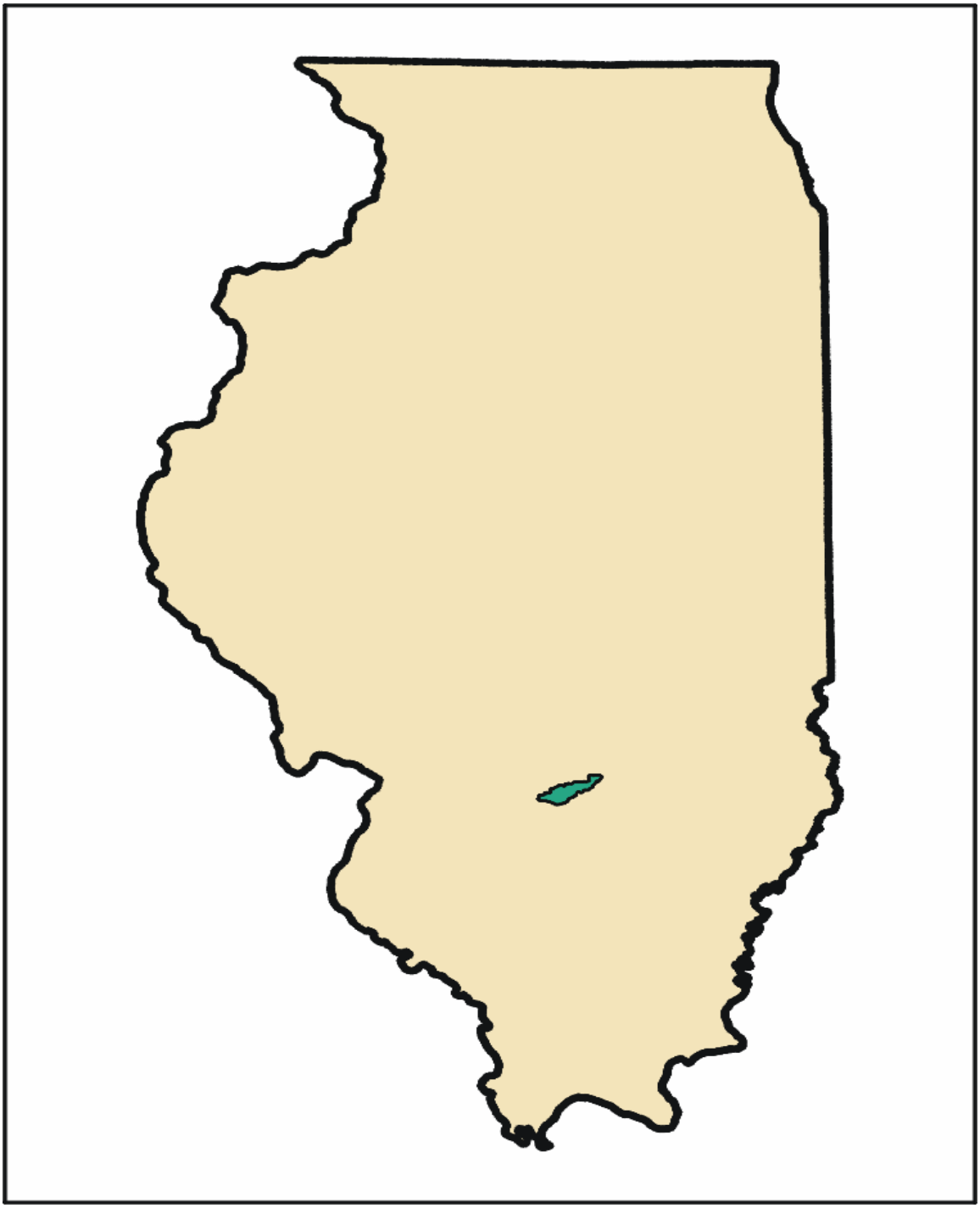


AERIAL ASSESSMENT REPORT FOR NORTH FORK KASKASKIA RIVER

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.

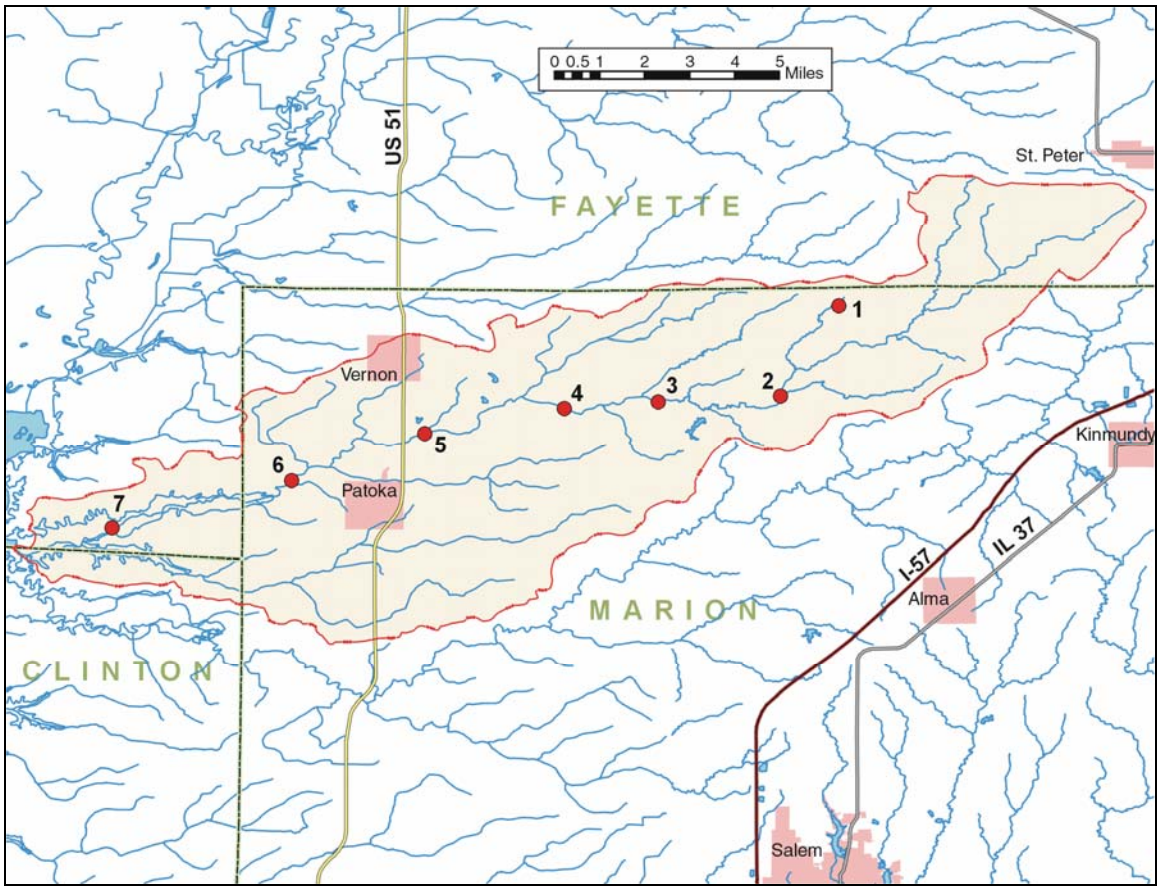


Fig. 1 Aerial Assessment Map of North Fork Kaskaskia River

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.

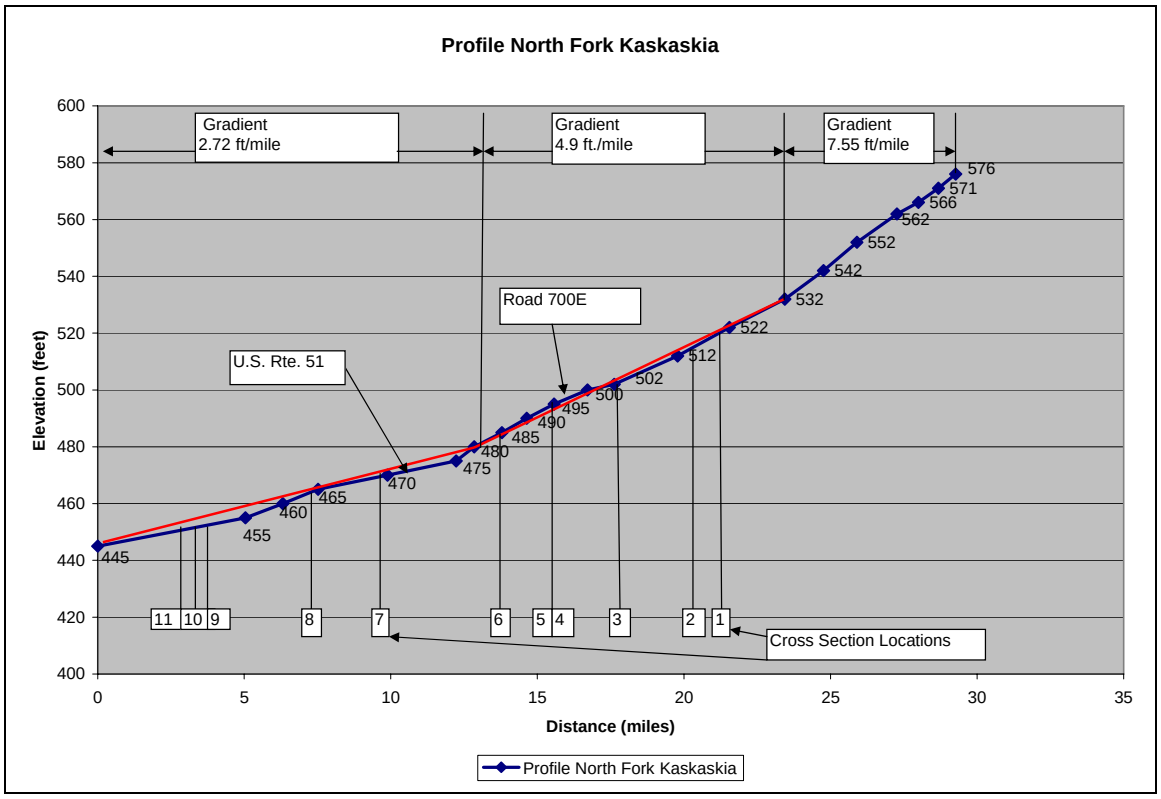


Figure 2 Channel Profile of East Fork Kaskaskia River

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".

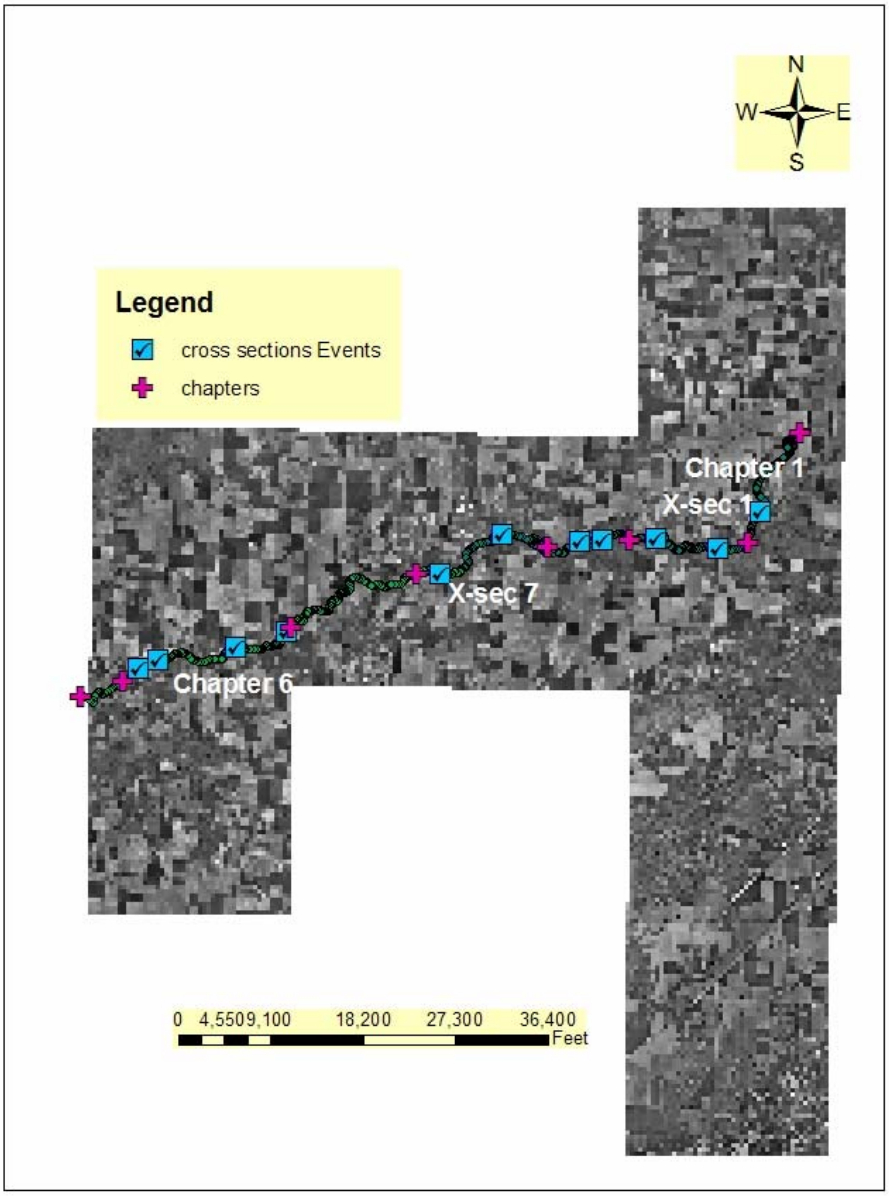


Fig. 4 Chapter Division and Cross Section locations

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 OUTCROP	LOGJAM	GEOTECH FAILURE	DEPOSITION	BED CONTROL	BREAK POINT	EROSION
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 Slope ft/mi.	Q2 CFS	BKF CFS	Width ft.	Mean Depth	W/D	Vel. FPS	Bedload In. Dia.	CEM (Simon)	CFS sq. mi.	BKF cfs /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

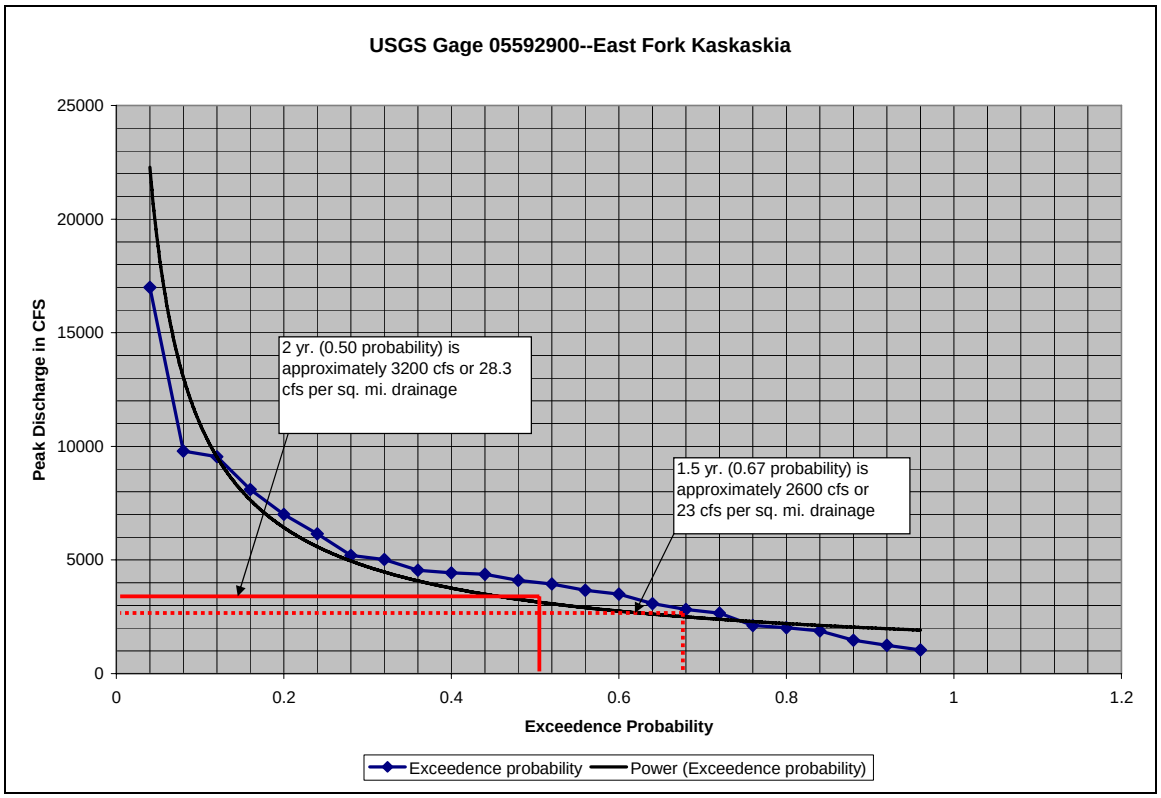


Fig. 5 Annual Maximum Peak Probability Curve: USGS Gage #05592900

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.

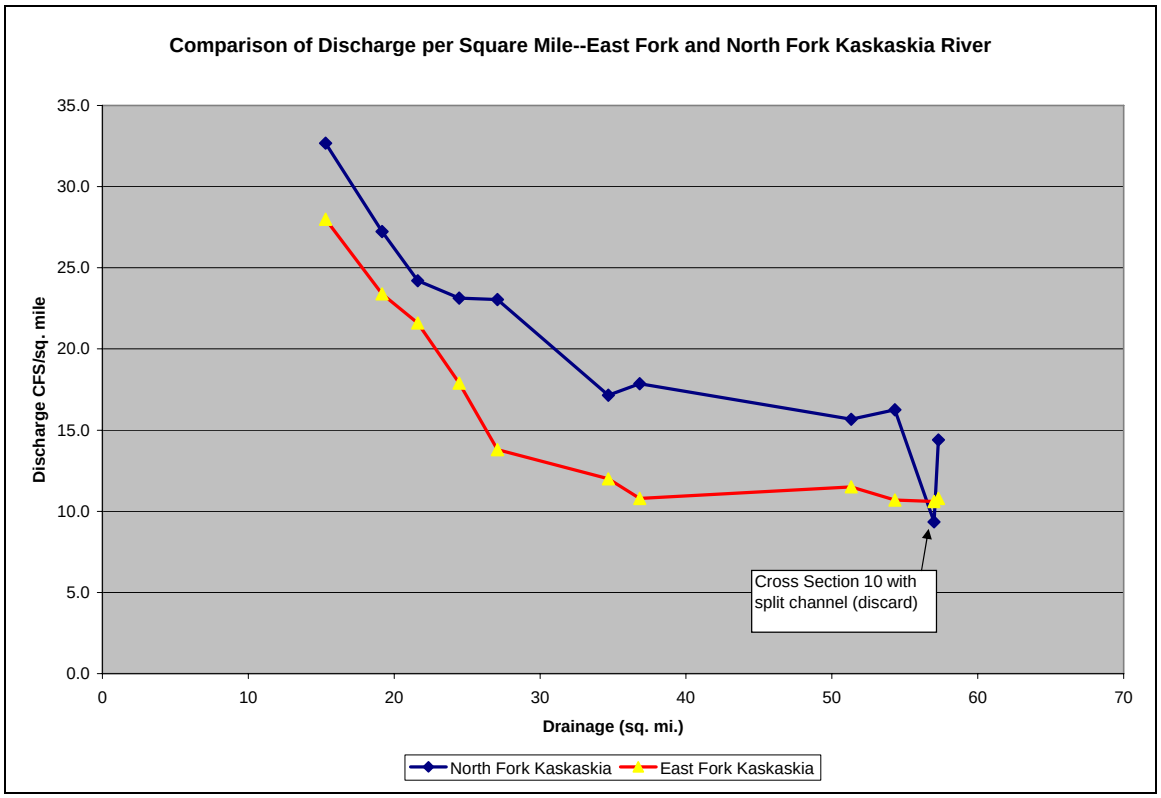


Fig. 6 Discharge comparison per square mile

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

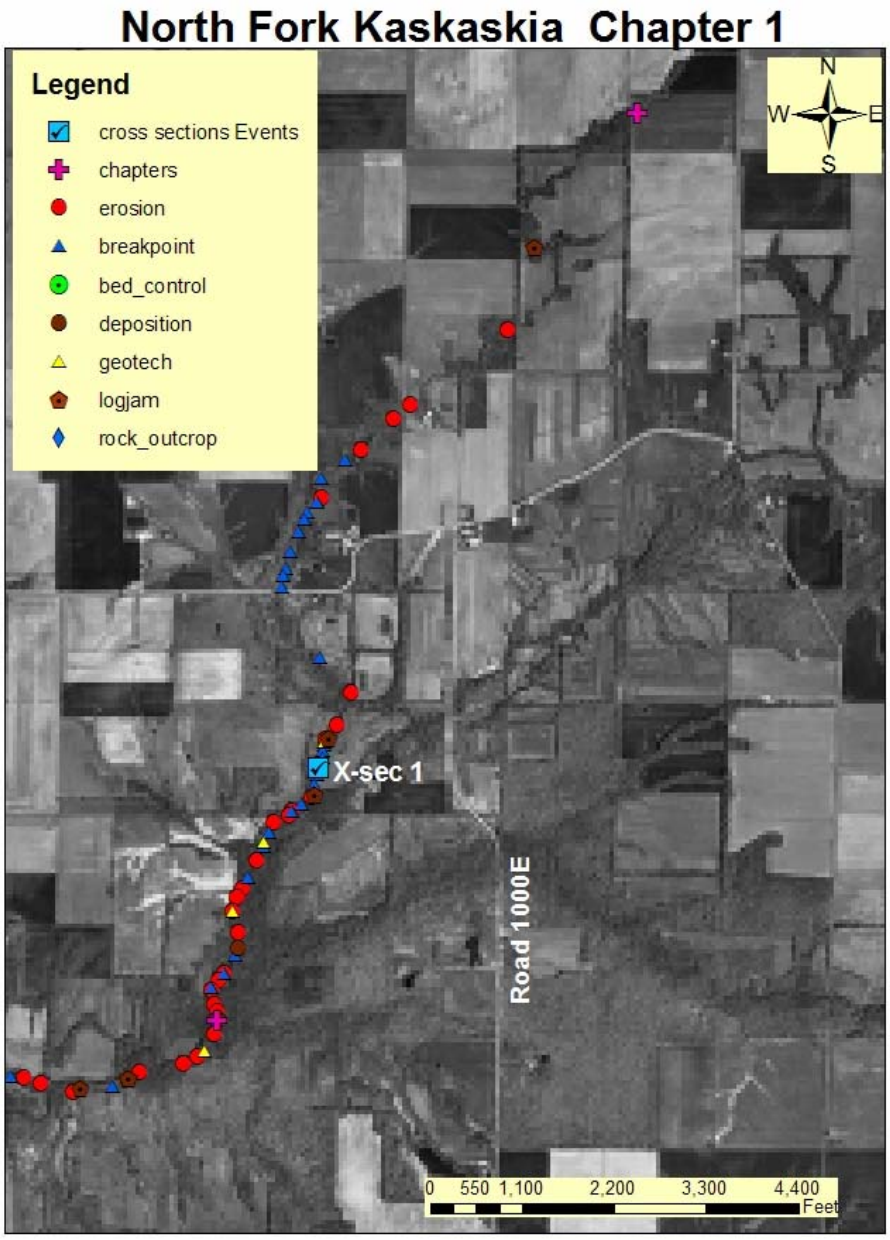


Fig. 9 Chapter 1

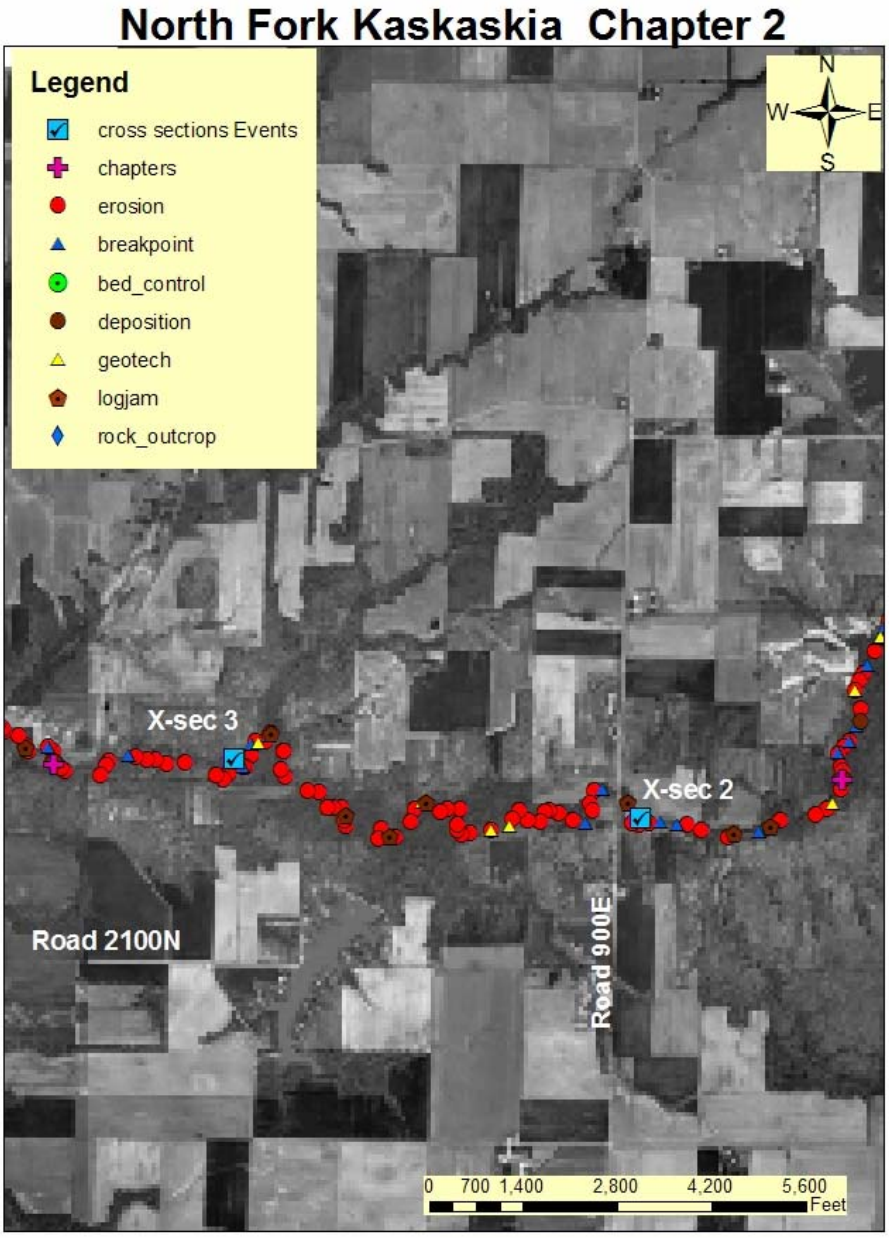


Figure 10 Chapter 2

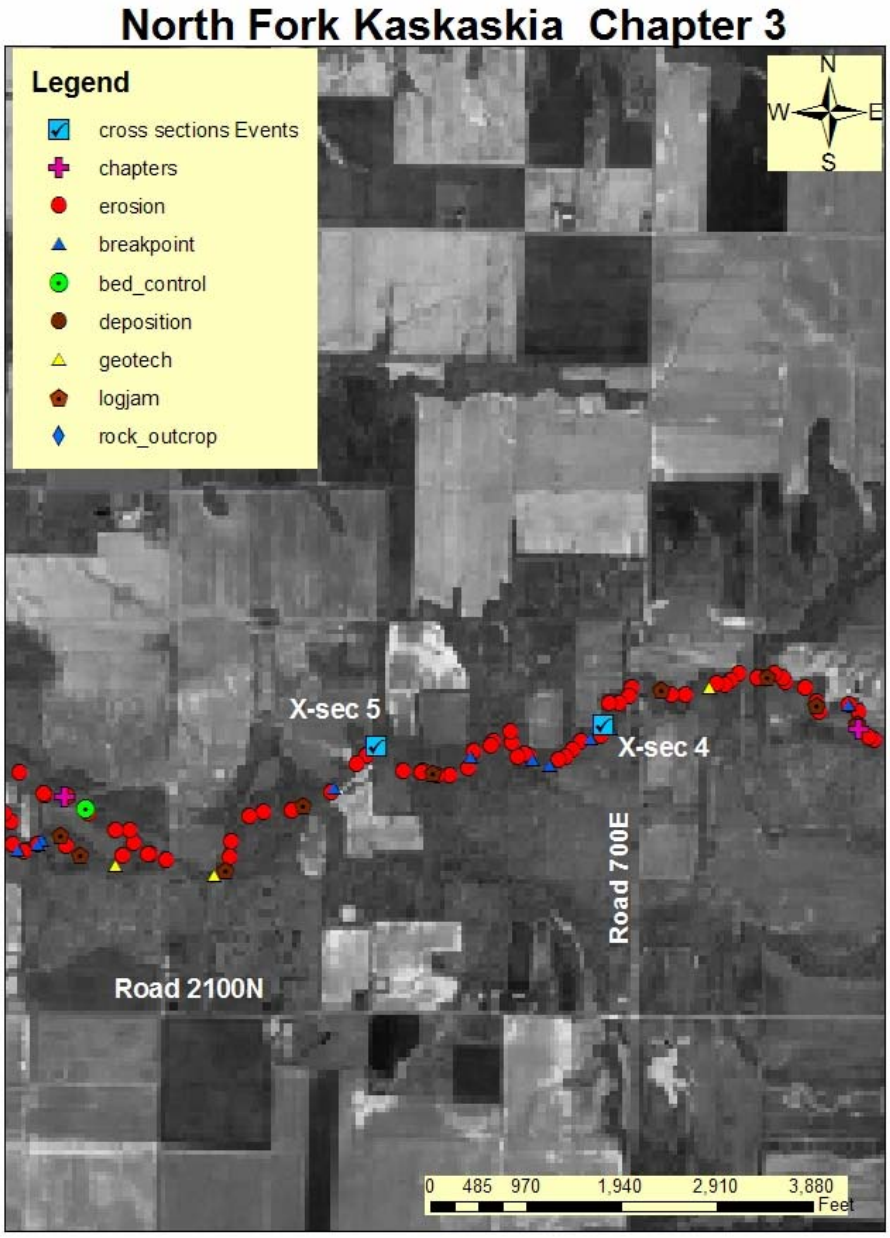


Fig. 11 Chapter 3

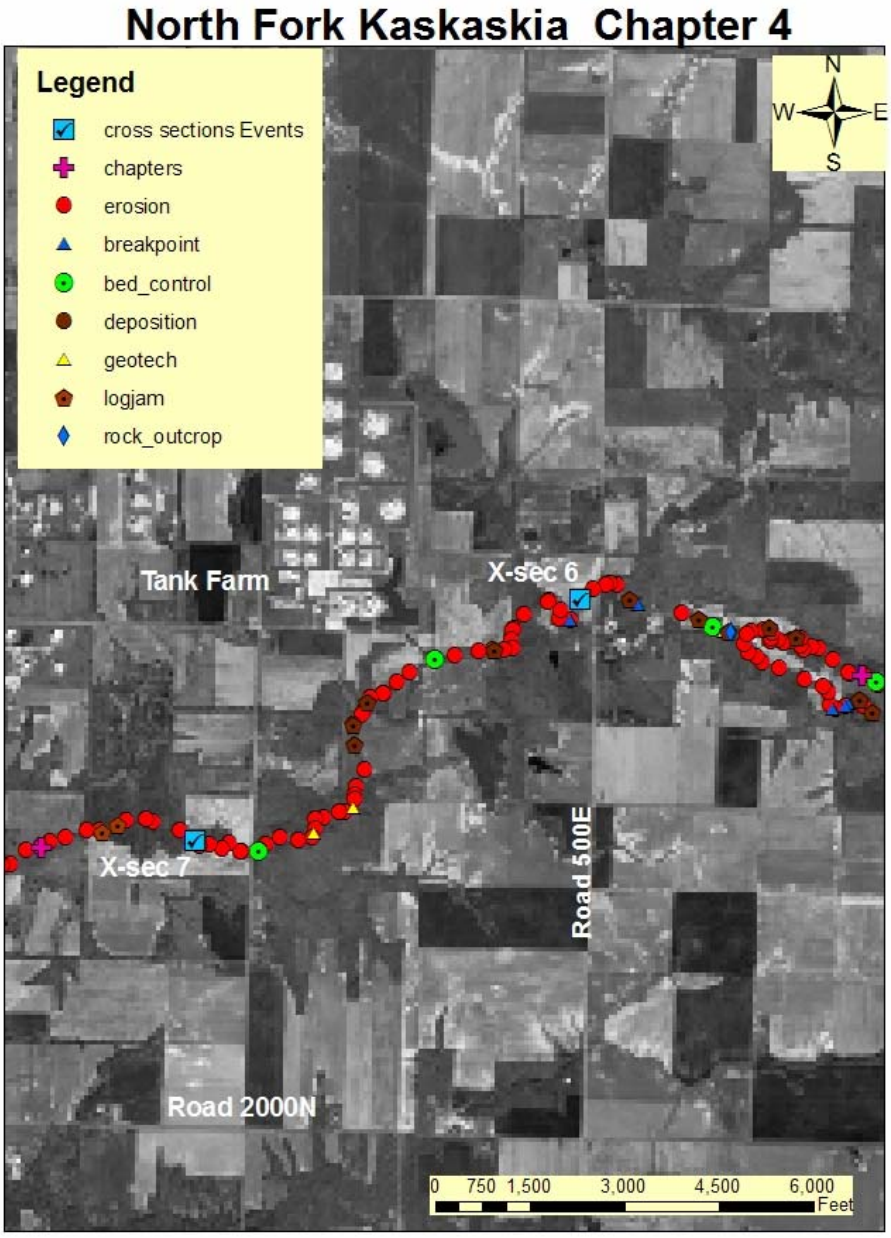


Fig. 12 Chapter 4

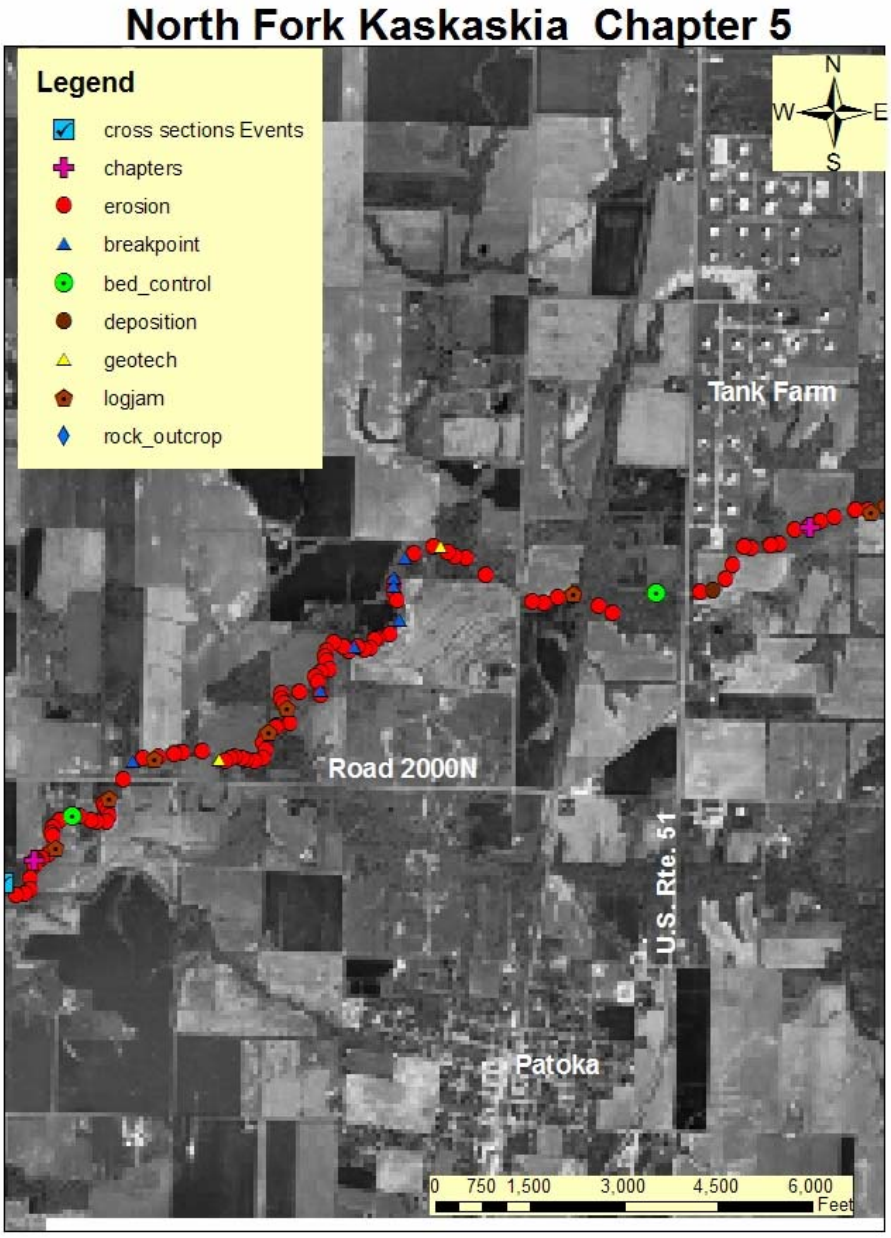


Fig. 13 Chapter 5

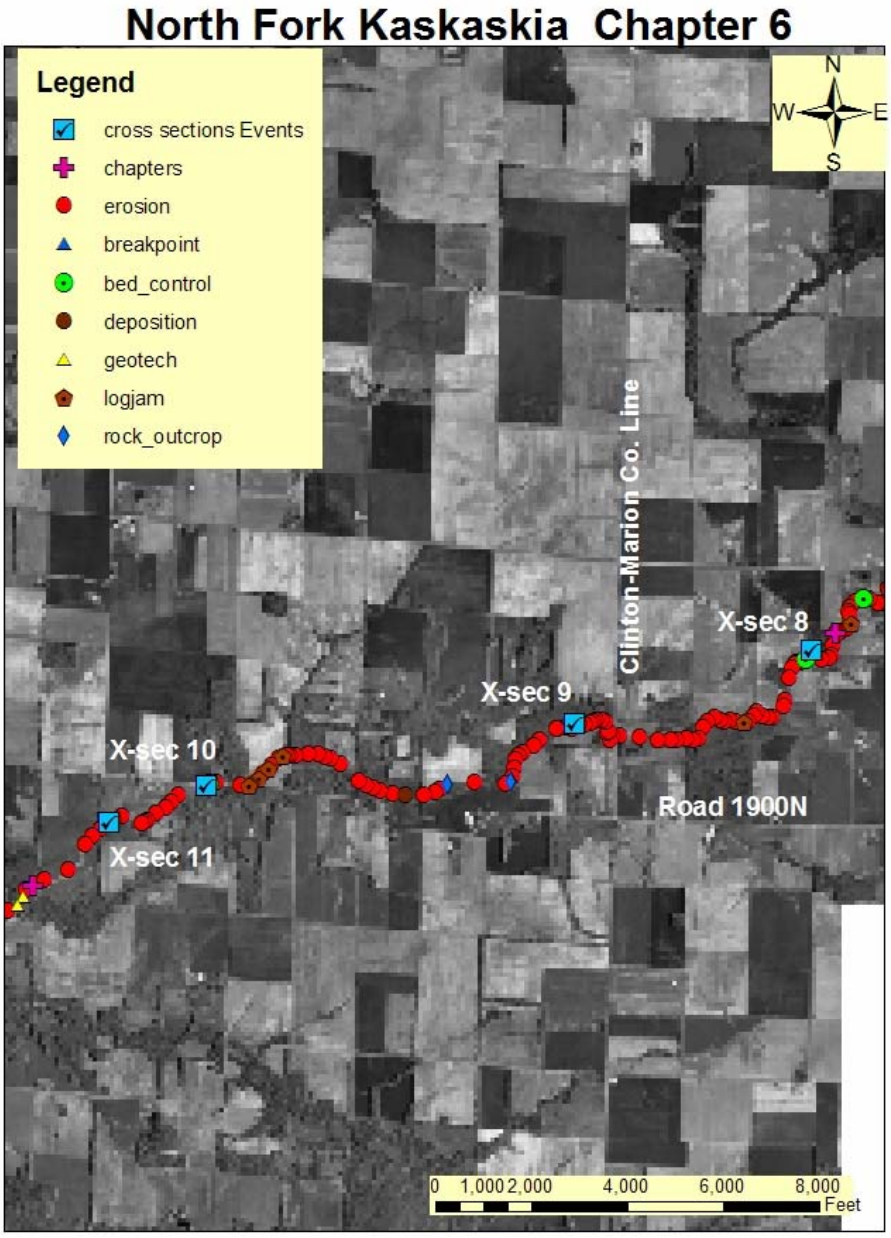


Fig. 14 Chapter 6

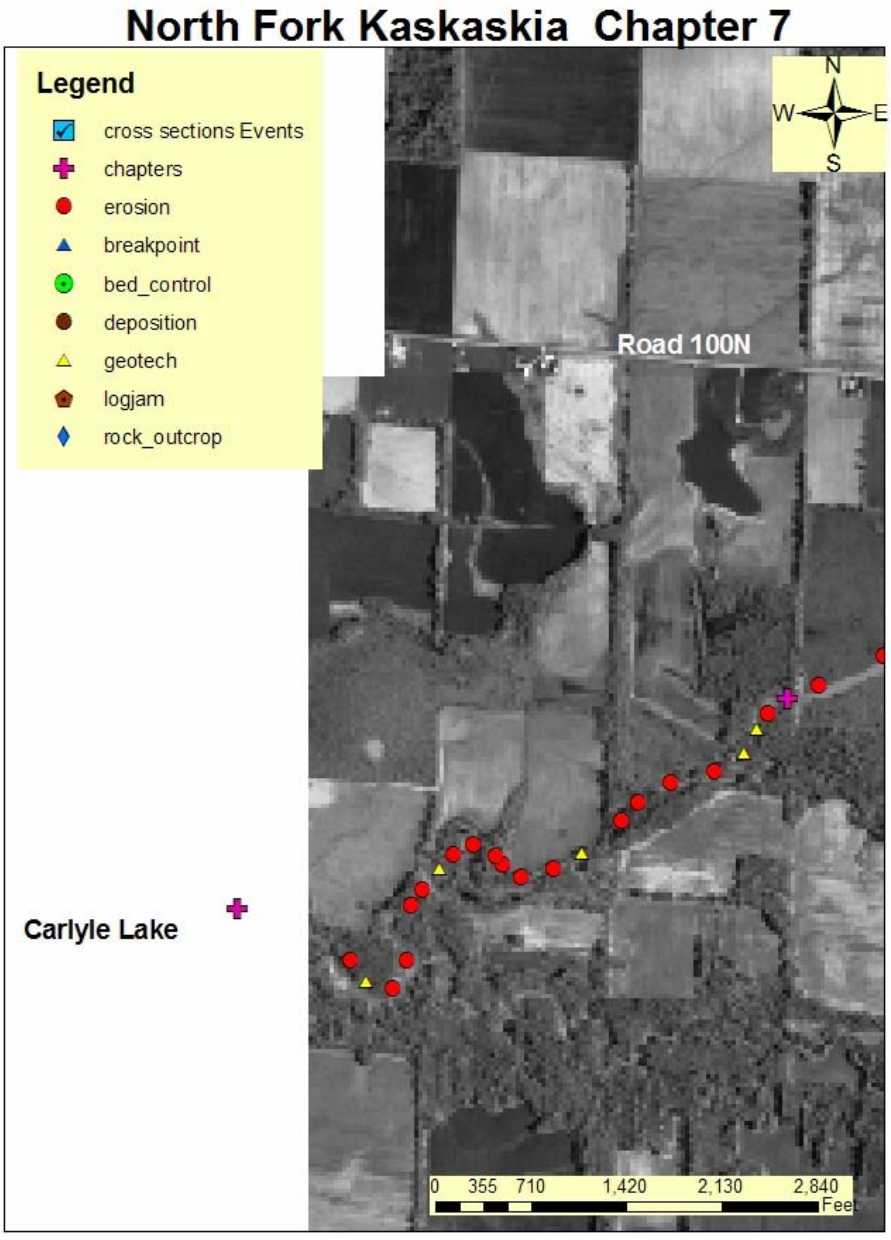


Fig. 15 Chapter 7

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. Clear Cells

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 (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) — Rainfall 3.30 in *(2 yr, 24 hr)* — Adjusted Q_2 1436 cfs

0.0013 *ft./ft.* — 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

			Stream Length		*ft.*		
Basic Field Data:			Valley Length		*ft.*		
Bankfull Width	36	*ft.*	Contour Interval		feet		
Mean Bankfull Depth	4.58	*ft.*	Estimated Sinuosity				
Width/Depth Ratio	7.86						
			Channel Slope:			Bankfull Q from:	
Max. Bankfull Depth	6.5	*ft.*	Surveyed:	0.00093	*ft./ft.*	Cross-Section	482 *cfs*
Width at twice max. depth	1000	*ft.*	Estimated:		*ft./ft.*	Basic field data	517 *cfs*
(13.0 ft.)						Selected Q	500 *cfs*
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:	D_{90}	1 *in.*	Velocity required to move D_{90}:	2.1	*ft./sec.*
	D_{50}	*in.*	Velocity from Cross-Section data:	2.92	*ft./sec.*
GOAL: Develop confidence by matching			Velocity from basic field data:	3.13	*ft./sec.*
velocities from different sources.			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

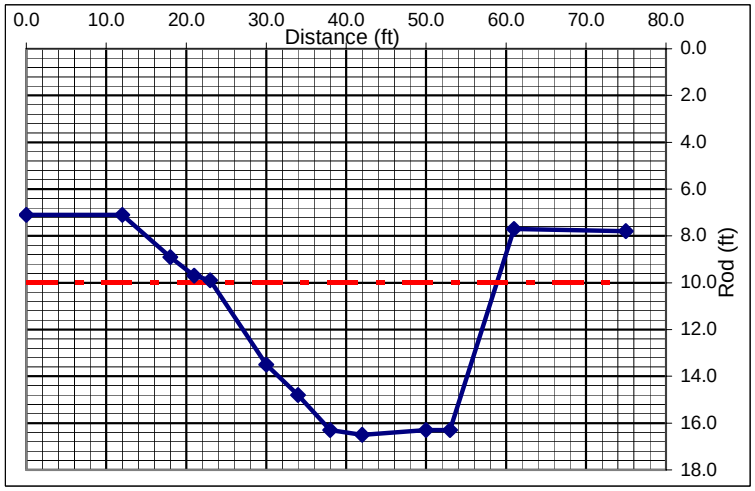
back to I&E form

Clear Cells

		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	

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



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. Clear Cells

Regional Curve Predictions:

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

Reference Stream Gage:

none Station No. - Gage Q_2 -

0 - Drainage Area - Regression -

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

Valley Slope: 6.7 *ft./mi. (user-entered)* Regression Q_2 966 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

0.0013 *ft./ft.* Regional Factor 1.057 Typical Range for Bankfull Discharge:

380 to 780 cfs

Local Stream Morphology:

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

Manning's "n" 0.04

Basic Field Data:					
Bankfull Width	35	*ft.*	Stream Length		*ft.*
Mean Bankfull Depth	4.79	*ft.*	Valley Length		*ft.*
Width/Depth Ratio	7.31		Contour Interval		feet
			Estimated Sinuosity		
			Channel Slope:		Bankfull Q from:
Max. Bankfull Depth	6.3	*ft.*	Surveyed:	0.00093 *ft./ft.*	Cross-Section 502 *cfs*
Width at twice max. depth	800	*ft.*	Estimated:	*ft./ft.*	Basic field data 541 *cfs*
(12.6 ft.)					Selected Q 522 *cfs*
Entrenchment Ratio	22.86		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}	*in.*	Velocity from Cross-Section data:	3.00	*ft./sec.*
GOAL: Develop confidence by matching			Velocity from basic field data:	3.23	*ft./sec.*
velocities from different sources.			Velocity from selected Q:	3.1	*ft./sec.*

Channel Evolution Stage III Stream Type (Rosgen)

Notes

27.2 cfs/sq. mile

Natural Open Channel Flow

Project:	X-sec 2	
Assisted by:	Wayne Kinney	
Date:	9/15/2005	
Channel Slope (***S***):	0.000930	*ft/ft*
Manning's ***n***:	0.040	
Flow Depth:	6.3	*ft*

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

assuming uniform, steady flow

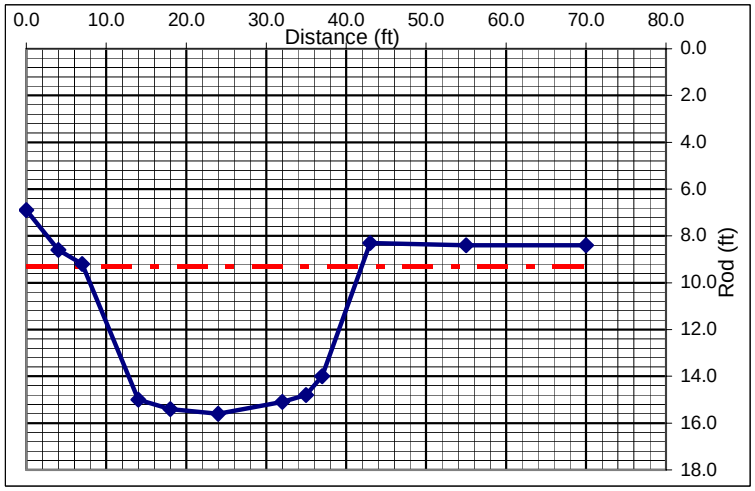
back to I&E form

Clear Cells

		Trial Depth 2	*Trial Depth 3*
Selected Flow Depth:	6.3 *ft*	7.3	
Channel Flow (***Q***):	502.1 *cfs*	473.5	
Channel Velocity:	3.0 *ft/sec*	2.3	
Cross-Sectional Area (***A***):	167.6 *sq.ft.*	207.1	
Hydraulic Radius (***R***):	4.3 *ft*	2.9	

Survey Data:

Rod *(ft)*	Distance *(ft)*
6.9	0.0
8.6	4.0
9.2	7.0
15.0	14.0
15.4	18.0
15.6	24.0
15.1	32.0
14.8	35.0
14.0	37.0
8.30	43
8.40	55
8.40	70



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. E326571 N4295146

Landowner Name Xsec 3

Drainage Area 21.61 sq. mi. Clear Cells

Regional Curve Predictions:

Bankfull dimensions Width 50 ft. Cross Sectional Area 181 sq. ft.

Depth 3.7 ft.

Reference Stream Gage:

none Station No. - Gage Q_2 -

Drainage Area - Regression -

0 - **REFERENCE STREAM DATA ONLY**

USGS Flood-Peak Discharge Predictions:

Valley Slope: 6.2 *ft./mi. (user-entered)* Regression Q_2 1023 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

0.0012 *ft./ft.* Regional Factor 1.057 Typical Range for Bankfull Discharge:

400 to 820 cfs

Local Stream Morphology:

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

Manning's "n" 0.04

Stream Length *ft.*

Basic Field Data: Valley Length *ft.*

Bankfull Width 41 *ft.* Contour Interval feet

Mean Bankfull Depth 4.32 *ft.* Estimated Sinuosity

Width/Depth Ratio 9.49

Channel Slope: Bankfull Q from:

Max. Bankfull Depth 7.2 *ft.* Surveyed: 0.00093 *ft./ft.* Cross-Section 511 *cfs*

Width at twice max. depth 1000 *ft.* Estimated: *ft./ft.* Basic field data 534 *cfs*

(14.4 ft.) Selected Q 523 *cfs*

Entrenchment Ratio 24.39 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} *in.* Velocity from Cross-Section data: 2.89 *ft./sec.*

GOAL: Develop confidence by matching Velocity from basic field data: 3.01 *ft./sec.*

velocities from different sources. Velocity from selected Q: 3.0 *ft./sec.*

Channel Evolution Stage III Stream Type (Rosgen)

Notes

24.2 cfs/ sq. mile

Natural Open Channel Flow

Project:	Xsec 3	
Assisted by:	Wayne Kinney	
Date:	9/15/2005	
Channel Slope (***S***):	0.000930	*ft/ft*
Manning's ***n***:	0.040	
Flow Depth:	7.2	*ft*

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

assuming uniform, steady flow

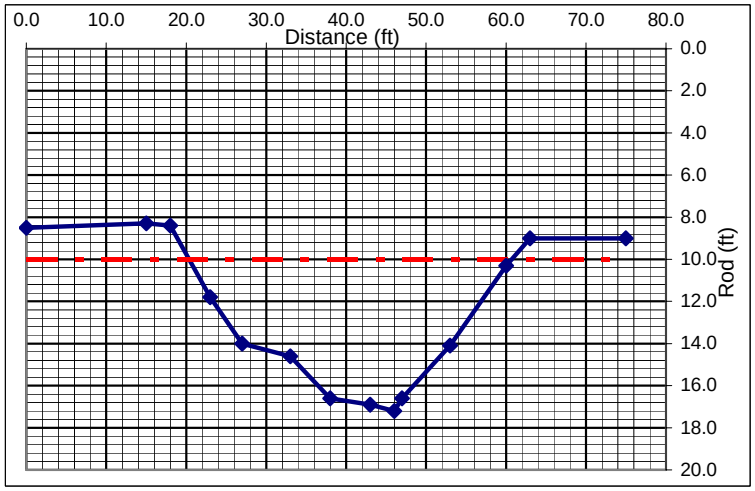
back to I&E form

Clear Cells

		Trial Depth 2	*Trial Depth 3*
Selected Flow Depth:	7.2 *ft*	8.2	
Channel Flow (***Q***):	511.3 *cfs*	590.8	
Channel Velocity:	2.9 *ft/sec*	2.7	
Cross-Sectional Area (***A***):	177.2 *sq.ft.*	219.4	
Hydraulic Radius (***R***):	4.1 *ft*	3.7	

Survey Data:

Rod *(ft)*	Distance *(ft)*
8.5	0.0
8.3	15.0
8.4	18.0
11.8	23.0
14.0	27.0
14.6	33.0
16.6	38.0
16.9	43.0
17.2	46.0
16.60	47
14.10	53
10.30	60
9.00	63
9.00	75



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. E324966 N4295138

Landowner Name xsec 4

Drainage Area 24.46 sq. mi. Clear Cells

Regional Curve Predictions:

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

Reference Stream Gage:

none Station No. - Gage Q_2 -

Drainage Area - Regression -

0 - **REFERENCE STREAM DATA ONLY**

USGS Flood-Peak Discharge Predictions:

Valley Slope: 6.2 *ft./mi. (user-entered)* Regression Q_2 1128 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

0.0012 *ft./ft.* 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:					
Bankfull Width	43	*ft.*	Stream Length		*ft.*
Mean Bankfull Depth	4.41	*ft.*	Valley Length		*ft.*
Width/Depth Ratio	9.75		Contour Interval		feet
			Estimated Sinuosity		
Max. Bankfull Depth	6.3	*ft.*	*Channel Slope:*		
Width at twice max. depth	800	*ft.*	Surveyed:	0.00093	*ft./ft.*
(12.6 ft.)			Estimated:		*ft./ft.*
Entrenchment Ratio	18.60		Radius of Curvature (Rc)		ft.
			Rc/Bankfull width:	0.00	

Bankfull Q from:

Cross-Section	552	*cfs*
Basic field data	580	*cfs*
Selected Q	566	*cfs*

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} *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

Natural Open Channel Flow

back to I&E form

Clear Cells

Project:	xsec 4
Assisted by:	Wayne Kinney
Date:	9/15/2005
Channel Slope (***S***):	0.000930 *ft/ft*
Manning's ***n***:	0.040
Flow Depth:	6.3 *ft*

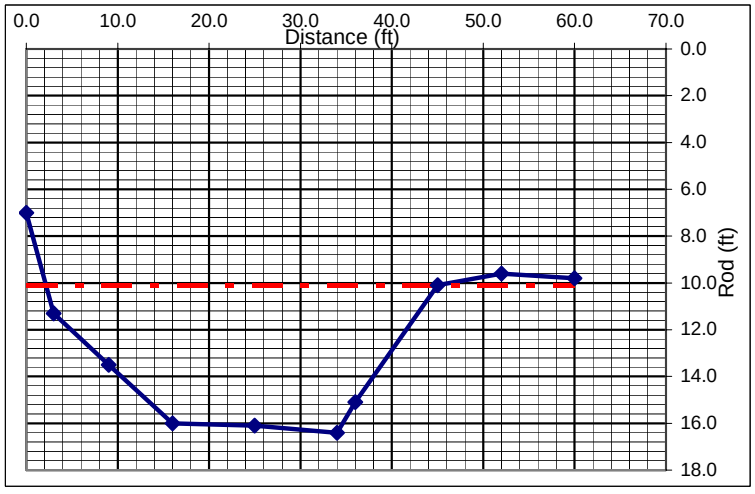
$$Q \circ \frac{1.486}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

assuming uniform, steady flow

		Trial Depth 2	*Trial Depth 3*
Selected Flow Depth:	6.3 *ft*	6.8	
Channel Flow (***Q***):	552.2 *cfs*	547.6	
Channel Velocity:	2.9 *ft/sec*	2.6	
Cross-Sectional Area (***A***):	189.6 *sq.ft.*	213.7	
Hydraulic Radius (***R***):	4.1 *ft*	3.4	

Survey Data:

Rod *(ft)*	Distance *(ft)*
7.0	0.0
11.3	3.0
13.5	9.0
16.0	16.0
16.1	25.0
16.4	34.0
15.1	36.0
10.1	45.0
9.6	52.0
9.80	60



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. 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 -

Drainage Area - Regression -

0 - **REFERENCE STREAM DATA ONLY**

USGS Flood-Peak Discharge Predictions:

Valley Slope: 6.2 *ft./mi. (user-entered)* Regression Q_2 1223 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

0.0012 *ft./ft.* Regional Factor 1.057 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

Stream Length *ft.*

Basic Field Data: Valley Length *ft.*

Bankfull Width 48 *ft.* Contour Interval feet

Mean Bankfull Depth 4.37 *ft.* Estimated Sinuosity

Width/Depth Ratio 10.98

Channel Slope: Bankfull Q from:

Max. Bankfull Depth 5.6 *ft.* Surveyed: 0.00093 *ft./ft.* Cross-Section 610 *cfs*

Width at twice max. depth 800 *ft.* Estimated: *ft./ft.* Basic field data 637 *cfs*

(11.2 ft.) Selected Q 624 *cfs*

Entrenchment Ratio 16.67 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} *in.* Velocity from Cross-Section data: 2.91 *ft./sec.*

GOAL: Develop confidence by matching Velocity from basic field data: 3.04 *ft./sec.*

velocities from different sources. 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:	xsec5
Assisted by:	Wayne Kinney
Date:	9/15/2005
Channel Slope (***S***):	0.000930 *ft/ft*
Manning's ***n***:	0.040
Flow Depth:	5.6 *ft*

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

assuming uniform, steady flow

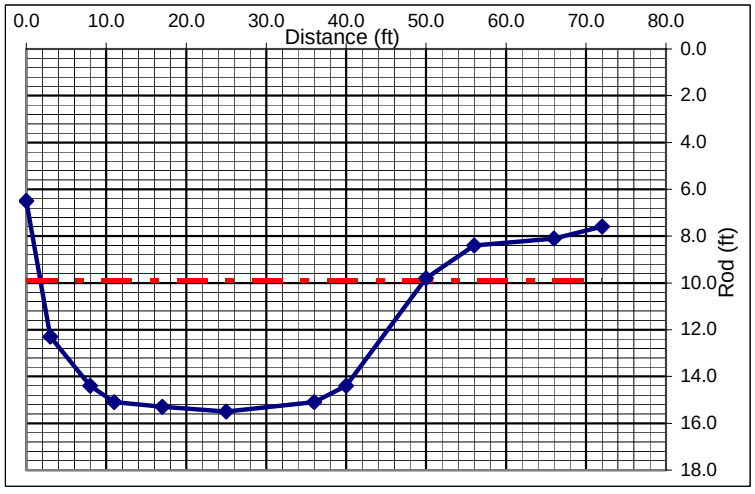
back to I&E form

Clear Cells

		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	

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



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. Clear Cells

Regional Curve Predictions:

Bankfull dimensions				
	Width	59 ft.	Cross Sectional Area	249 sq. ft.
	Depth	4.2 ft.		

Reference Stream Gage:

none Station No. - Gage Q_2 -

Drainage Area - Regression -

0 - **REFERENCE STREAM DATA ONLY**

USGS Flood-Peak Discharge Predictions:

Valley Slope: 5.9 *ft./mi. (user-entered)* Regression Q_2 1452 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

0.0011 *ft./ft.* Regional Factor 1.057 Typical Range for Bankfull Discharge:

580 to 1170 cfs

Local Stream Morphology:

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

Manning's "n" 0.04

Basic Field Data:					
Bankfull Width	38	*ft.*	Stream Length		*ft.*
Mean Bankfull Depth	5.91	*ft.*	Valley Length		*ft.*
Width/Depth Ratio	6.43		Contour Interval		feet
			Estimated Sinuosity		
Max. Bankfull Depth	8.2	*ft.*	*Channel Slope:*		
Width at twice max. depth	1000	*ft.*	Surveyed:	0.00052 *ft./ft.*	
(16.4 ft.)			Estimated:	*ft./ft.*	
Entrenchment Ratio	26.32		Radius of Curvature (Rc)		ft.
			Rc/Bankfull width:	0.00	

Bankfull Q from:

Cross-Section	566	*cfs*
Basic field data	624	*cfs*
Selected Q	595	*cfs*

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}	*in.*	Velocity from Cross-Section data:	2.52	*ft./sec.*
GOAL: Develop confidence by matching			Velocity from basic field data:	2.78	*ft./sec.*
velocities from different sources.			Velocity from selected Q:	2.6	*ft./sec.*

Channel Evolution Stage II Stream Type (Rosgen)

Notes

17.2 cfs/sq. mile

Natural Open Channel Flow

back to I&E form

Clear Cells

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

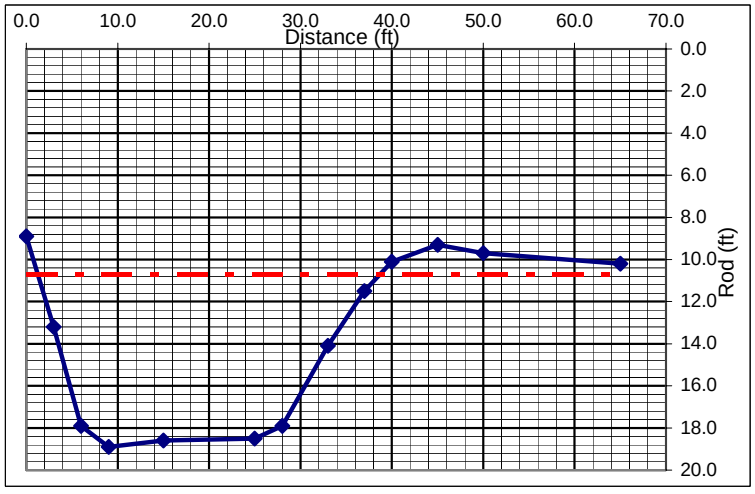
assuming uniform, steady flow

Project:	xsec 6	
Assisted by:	Wayne Kinney	
Date:	9/15/2005	
Channel Slope (***S***):	0.000520	*ft/ft*
Manning's ***n***:	0.040	
Flow Depth:	8.2	*ft*

		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	

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



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. Clear Cells

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 Q_2 -

0 - Drainage Area - Regression (-

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

Valley Slope: 5.1 *ft./mi. (user-entered)* Regression Q_2 1419 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

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:					
Bankfull Width	47	*ft.*	Stream Length		*ft.*
Mean Bankfull Depth	5.45	*ft.*	Valley Length		*ft.*
Width/Depth Ratio	8.62		Contour Interval		feet
			Estimated Sinuosity		
Max. Bankfull Depth	8.1	*ft.*	*Channel Slope:*		
Width at twice max. depth	800	*ft.*	Surveyed:	0.00052	*ft./ft.*
(16.2 ft.)			Estimated:		*ft./ft.*
Entrenchment Ratio	17.02		Radius of Curvature (Rc)		ft.
			Rc/Bankfull width:	0.00	

Bankfull Q from:

Cross-Section	642	*cfs*
Basic field data	674	*cfs*
Selected Q	658	*cfs*

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} *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.

Natural Open Channel Flow

Project:	Xsec 7	
Assisted by:	Wayne Kinney	
Date:	9/15/2005	
Channel Slope (***S***):	0.000520	*ft/ft*
Manning's ***n***:	0.040	
Flow Depth:	8.1	*ft*

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

assuming uniform, steady flow

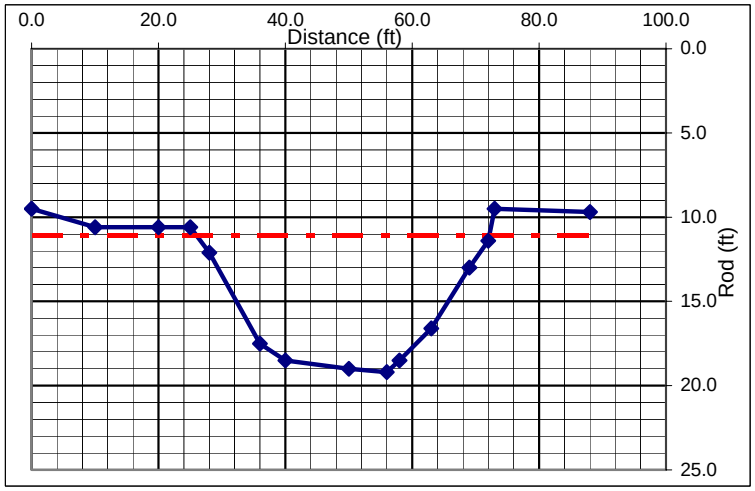
back to I&E form

Clear Cells

		Trial Depth 2	*Trial Depth 3*
Selected Flow Depth:	8.1 *ft*	9.7	
Channel Flow (***Q***):	642.2 *cfs*	725.8	
Channel Velocity:	2.5 *ft/sec*	2.0	
Cross-Sectional Area (***A***):	256.0 *sq.ft.*	355.5	
Hydraulic Radius (***R***):	5.1 *ft*	3.7	

Survey Data:

Rod *(ft)*	Distance *(ft)*
9.5	0.0
10.6	10.0
10.6	20.0
10.6	25.0
12.1	28.0
17.5	36.0
18.5	40.0
19.0	50.0
19.2	56.0
18.50	58
16.60	63
13.00	69
11.40	72
9.50	73
9.70	88



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. E315439 N4292365

Landowner Name xsec 8

Drainage Area 51.33 sq. mi. Clear Cells

Regional Curve Predictions:

Bankfull dimensions				
	Width	69 ft.	Cross Sectional Area	325 sq. ft.
	Depth	4.7 ft.		

Reference Stream Gage:

none Station No. - Gage Q_2 -

0 - Drainage Area - Regression (-

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

Valley Slope: 4.7 *ft./mi. (user-entered)* Regression Q_2 1774 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

0.0009 *ft./ft.* Regional Factor 1.057 Typical Range for Bankfull Discharge:

700 to 1420 cfs

Local Stream Morphology:

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

Manning's "n" 0.04

Basic Field Data:					
Bankfull Width	51	*ft.*	Stream Length		*ft.*
Mean Bankfull Depth	5.88	*ft.*	Valley Length		*ft.*
Width/Depth Ratio	8.67		Contour Interval		feet
			Estimated Sinuosity		
Max. Bankfull Depth	8.4	*ft.*	*Channel Slope:*		
Width at twice max. depth	800	*ft.*	Surveyed:	0.00052	*ft./ft.*
(16.8 ft.)			Estimated:		*ft./ft.*
Entrenchment Ratio	15.69		Radius of Curvature (Rc)		ft.
			Rc/Bankfull width:	0.00	

Bankfull Q from:

Cross-Section	778	*cfs*
Basic field data	830	*cfs*
Selected Q	804	*cfs*

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}		*in.*	Velocity from Cross-Section data:	2.59 *ft./sec.*
GOAL: Develop confidence by matching				Velocity from basic field data:	2.77 *ft./sec.*
velocities from different sources.				Velocity from selected Q:	2.7 *ft./sec.*

Channel Evolution Stage III Stream Type (Rosgen)

Notes

15.7 cfs/sq. mile

Natural Open Channel Flow

Project:	xsec 8	
Assisted by:	Wayne Kinney	
Date:	9/15/2005	
Channel Slope (***S***):	0.000520	*ft/ft*
Manning's ***n***:	0.040	
Flow Depth:	8.4	*ft*

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

assuming uniform, steady flow

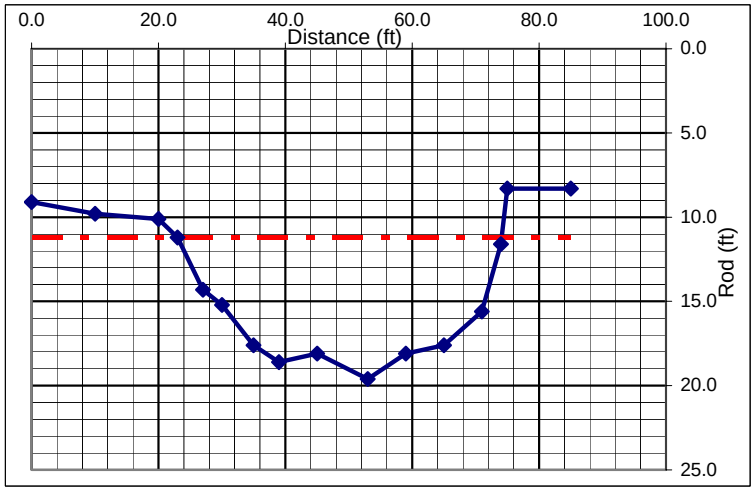
back to I&E form

Clear Cells

		Trial Depth 2	*Trial Depth 3*
Selected Flow Depth:	8.4 *ft*	10.5	
Channel Flow (***Q***):	778.3 *cfs*	1,082.2	
Channel Velocity:	2.6 *ft/sec*	2.5	
Cross-Sectional Area (***A***):	300.0 *sq.ft.*	424.6	
Hydraulic Radius (***R***):	5.4 *ft*	5.2	

Survey Data:

Rod *(ft)*	Distance *(ft)*
9.1	0.0
9.8	10.0
10.1	20.0
11.2	23.0
14.3	27.0
15.2	30.0
17.6	35.0
18.6	39.0
18.1	45.0
19.60	53
18.10	59
17.60	65
15.60	71
11.60	74
8.30	75
8.3	85



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. E313939 N4291900

Landowner Name xsec 9

Drainage Area 54.33 sq. mi. Clear Cells

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 Q_2 -

0 - Drainage Area - Regression (-

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

Valley Slope: 4.7 *ft./mi. (user-entered)* Regression Q_2 1855 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

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:		Bankfull Q from:
Max. Bankfull Depth	9	*ft.*	Surveyed:	0.00052 *ft./ft.*	Cross-Section 856 *cfs*
Width at twice max. depth (18.0 ft.)	1000	*ft.*	Estimated:	*ft./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:				
D_{90}	1 *in.*	Velocity required to move D_{90}:	2.1	*ft./sec.*
D_{50}	*in.*	Velocity from Cross-Section data:	2.66	*ft./sec.*
GOAL: Develop confidence by matching		Velocity from basic field data:	2.83	*ft./sec.*
velocities from different sources.		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

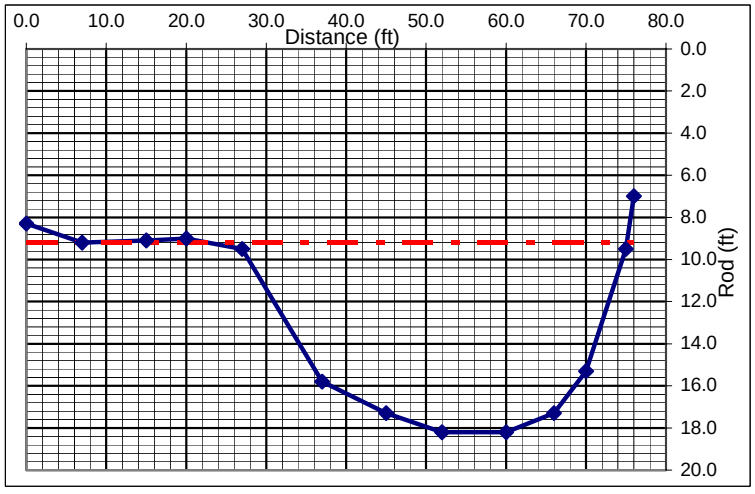
back to I&E form

Clear Cells

		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	

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



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. Clear Cells

Regional Curve Predictions:

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

Reference Stream Gage:

none

0 -

Station No. - Gage Q_2 -

Drainage Area - Regression (-

REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

Valley Slope: 4.7 *ft./mi. (user-entered)*

ft/mi (from worksheet)

0.0009 *ft./ft.*

Rainfall 3.40 in *(2 yr, 24 hr)*

Regional Factor 1.057

Regression Q_2 1927 cfs

Adjusted Q_2 -

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

Basic Field Data:

Bankfull Width	36	*ft.*	Contour Interval		feet
Mean Bankfull Depth	5.81	*ft.*	Estimated Sinuosity		
Width/Depth Ratio	6.20				
Max. Bankfull Depth	7.8	*ft.*	Stream Length		*ft.*
Width at twice max. depth	1000	*ft.*	Valley Length		*ft.*
(15.6 ft.)					
Entrenchment Ratio	27.78		Radius of Curvature (Rc)		ft.
			Rc/Bankfull width:	0.00	

Channel Slope:

Surveyed: 0.00052 *ft./ft.*

Estimated: *ft./ft.*

Bankfull Q from:

Cross-Section	490	*cfs*
Basic field data	575	*cfs*
Selected Q	533	*cfs*

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

Bedload: D_{90} 1 *in.*

D_{50} *in.*

GOAL: Develop confidence by matching velocities from different sources.

Velocity required to move D_{90}:	2.1	*ft./sec.*
Velocity from Cross-Section data:	2.34	*ft./sec.*
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

Natural Open Channel Flow

Project:	xsec 10	
Assisted by:	Wayne Kinney	
Date:	9/15/2005	
Channel Slope (***S***):	0.000520	*ft/ft*
Manning's ***n***:	0.040	
Flow Depth:	7.8	*ft*

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

assuming uniform, steady flow

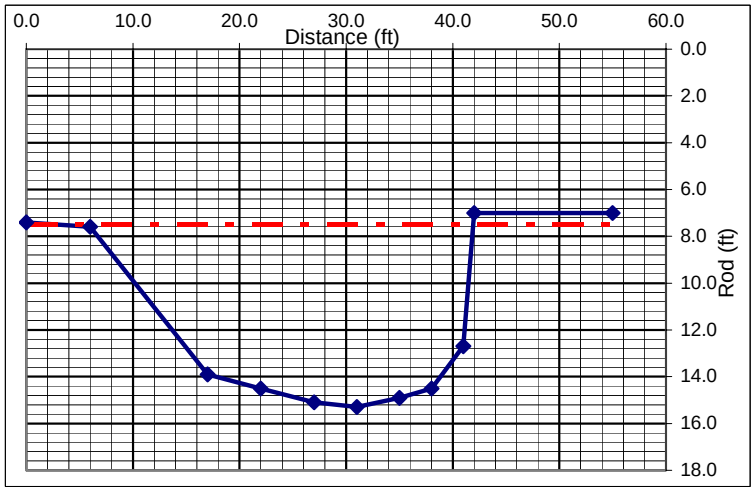
back to I&E form

Clear Cells

		Trial Depth 2	*Trial Depth 3*
Selected Flow Depth:	7.8 *ft*	7.9	
Channel Flow (***Q***):	490.1 *cfs*	484.3	
Channel Velocity:	2.3 *ft/sec*	2.3	
Cross-Sectional Area (***A***):	209.4 *sq.ft.*	213.4	
Hydraulic Radius (***R***):	4.6 *ft*	4.4	

Survey Data:

Rod *(ft)*	Distance *(ft)*
7.4	0.0
7.6	6.0
13.9	17.0
14.5	22.0
15.1	27.0
15.3	31.0
14.9	35.0
14.5	38.0
12.7	41.0
7.00	42
7.00	55



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. E310990 N4291279

Landowner Name xsec 11

Drainage Area 57.31 sq. mi. Clear Cells

Regional Curve Predictions:

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

Reference Stream Gage:

none Station No. - Gage Q_2 -

Drainage Area - Regression -

0 - **REFERENCE STREAM DATA ONLY**

USGS Flood-Peak Discharge Predictions:

Valley Slope: 4.7 *ft./mi. (user-entered)* Regression Q_2 1935 cfs

ft/mi (from worksheet) Rainfall 3.40 in *(2 yr, 24 hr)* Adjusted Q_2 -

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

Basic Field Data:					
Bankfull Width	58	*ft.*	Stream Length		*ft.*
Mean Bankfull Depth	5.49	*ft.*	Valley Length		*ft.*
Width/Depth Ratio	10.56		Contour Interval		feet
			Estimated Sinuosity		
Max. Bankfull Depth	8	*ft.*	*Channel Slope:*		
Width at twice max. depth (16.0 ft.)	1000	*ft.*	Surveyed:	0.00052	*ft./ft.*
			Estimated:		*ft./ft.*
Entrenchment Ratio	17.24		Radius of Curvature (Rc)		ft.
			Rc/Bankfull width:	0.00	

Bankfull Q from:

Cross-Section	807	*cfs*
Basic field data	842	*cfs*
Selected Q	825	*cfs*

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}		*in.*	Velocity from Cross-Section data:	2.53 *ft./sec.*
GOAL: Develop confidence by matching				Velocity from basic field data:	2.64 *ft./sec.*
velocities from different sources.				Velocity from selected Q:	2.6 *ft./sec.*

Channel Evolution Stage IV Stream Type (Rosgen)

Notes

14.4 cfs/sq. mile

Natural Open Channel Flow

Project:	xsec 11
Assisted by:	Wayne Kinney
Date:	9/15/2005
Channel Slope (***S***):	0.000520 *ft/ft*
Manning's ***n***:	0.040
Flow Depth:	8.0 *ft*

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

assuming uniform, steady flow

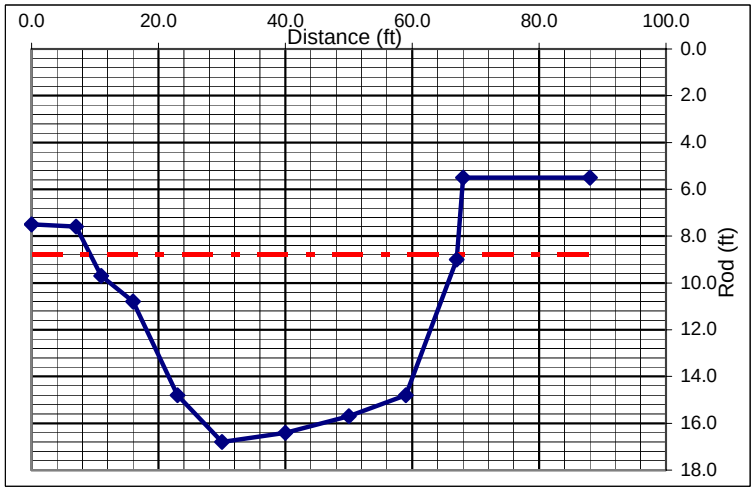
back to I&E form

Clear Cells

		Trial Depth 2	*Trial Depth 3*
Selected Flow Depth:	8.0 *ft*	9.3	
Channel Flow (***Q***):	806.6 *cfs*	1,039.0	
Channel Velocity:	2.5 *ft/sec*	2.6	
Cross-Sectional Area (***A***):	318.4 *sq.ft.*	395.7	
Hydraulic Radius (***R***):	5.2 *ft*	5.5	

Survey Data:

Rod *(ft)*	Distance *(ft)*
7.5	0.0
7.6	7.0
9.7	11.0
10.8	16.0
14.8	23.0
16.8	30.0
16.4	40.0
15.7	50.0
14.8	59.0
9.00	67
5.50	68
5.50	88



COMMENTS: