

# COUNTY OF KANE

**ENVIRONMENTAL AND BUILDING  
MANAGEMENT**  
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## **Kishwaukee River Headwaters Study Stakeholder Meeting** **Monday, February 26, 2007** **10:30 am** **Hampshire Village Hall**

### **Attendees:**

<b>Name</b>	<b>Agency</b>	<b>Phone</b>	<b>Email</b>	<b>Address</b>
Karen Kosky	Kane County Enviro. Mgmt	630-208-8665	<a href="mailto:koskykaren@co.kane.il.us">koskykaren@co.kane.il.us</a>	719 Batavia Avenue, Bldg A, Geneva, IL 60134
Elizabeth Murphy	USGS	217-344-0037	<a href="mailto:emurphy@usgs.gov">emurphy@usgs.gov</a>	1201 W. University Ave., Suite 100, Urbana, IL 61801
Tim Straub	USGS	(same)	<a href="mailto:tdstraub@usgs.gov">tdstraub@usgs.gov</a>	(same)
David Soong	USGS	(same)	<a href="mailto:dsoong@usgs.gov">dsoong@usgs.gov</a>	(same)
Darwin Conro	Hampshire Township	847-683-4480	<a href="mailto:darcon28@aol.com">darcon28@aol.com</a>	
Frank Engel	Coon Creek Drainage District	847-683-3870		31889 New Lebanon Rd, Hampshire, IL 60140
Randy Klein	Coon Creek Drainage District	847-683-3047		
John Emerson	Coon Creek Drainage District	815-784-2121		
Bill Blecke	Baxter & Woodman/ Village of Huntley	815-787-3111	<a href="mailto:wblecke@baxterwoodman.com">wblecke@baxterwoodman.com</a>	
Brad Sanderson	EEI/ Village of Hampshire	847-683-3100	<a href="mailto:bsanderson@eeiweb.com">bsanderson@eeiweb.com</a>	
John Whitehouse	EEI	630-466-6717	<a href="mailto:jwhitehouse@eeiweb.com">jwhitehouse@eeiweb.com</a>	
Suzanne Vermeer	Baxter & Woodman/ Village of Maple Park	815-459-1260	<a href="mailto:svermeer@baxterwoodman.com">svermeer@baxterwoodman.com</a>	
Paul Aderman	McHenry County Dept of Planning and Dev	815-334-4560		

### **Meeting Notes**

- (Kosky) Most of the watersheds covering the eastern part of Kane County have been modeled recently with the latest computer modeling technology and digital geographic data. The floodplains covering the western third of Kane County are based on outdated floodplain modeling or estimating techniques and data. Therefore, Kane County and the USGS will develop new floodplain maps based on the best available data and latest computer floodplain modeling techniques.
- (Kosky) The watersheds to be studied in this project include the Eakin, Coon, and Union watersheds in Kane County. These three are all headwaters of larger watersheds which all feed into the Kishwaukee River.

- (Murphy) The scope of the project will include areas shown on map (see attachment.) Some areas have already been recently restudied, and some are not included based on the amount of tributary area inside the Kane County boundary. This project will use the HEC-HMS and HEC-RAS Hydrologic and Hydraulic models to restudy these areas where the last floodplain models were developed in the 1970s.
- (Murphy) The project will be conducted over three years (2007-2009.) The watersheds will be modeled in the following order: Eakin, Coon, Union.
- (Murphy) The USGS will be using a regionalized data method to produce model input data. The following data will be used for developing the inputs:
  - Existing GIS, bridge/culvert or cross-sectional survey, and model data
  - Historic flooding data
  - Flow data collected from 6 crest-stage gages
 Any information on existing data in these watersheds should be sent to USGS. The use of existing data will ensure the least amount of redundancy and will maximize the calibration of the models to real-life flood events.
- (Murphy) If there are any comments on existing data, or comments about the maps, please mark them up and send back to USGS. Note that the map shows a distinction between detailed sections of creek and non-detailed. The detailed study streams will have floodplains and floodways mapped. The non-detailed streams were judged to be poorly-defined or outside the county boundary. These non-detailed streams will be mapped as Zone A.
- (Kosky) The end result of the modeling effort will be a new set of floodplain maps for these watersheds. The maps will be produced in hard-copy and also available digitally. The model data will be made available at the conclusion of the project. A project website will be posted with the model information during the next year.
- If there are any questions about this project, please contact Karen Kosky – 630-208-8665 / [koskykaren@co.kane.il.us](mailto:koskykaren@co.kane.il.us)

Attachments:

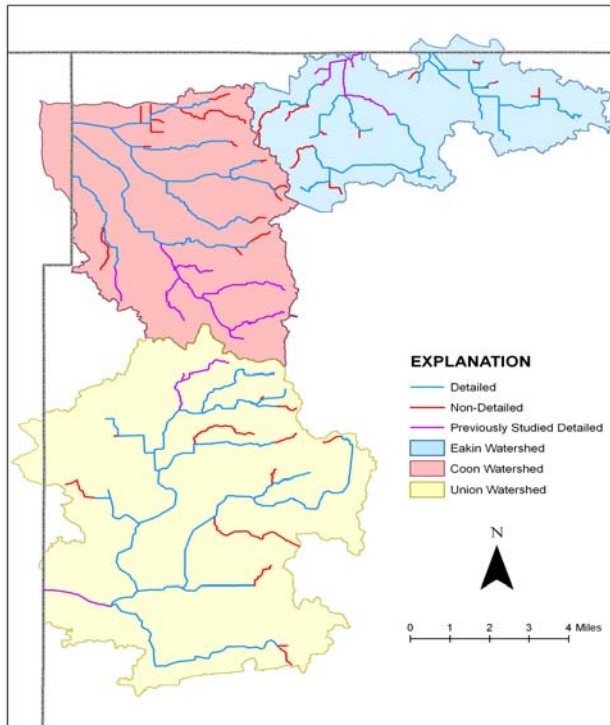
- USGS Meeting Notes & Project Information page
- USGS Blackberry Creek modeling project overview page (example of another USGS/Kane County modeling project near completion.)

## Kishwaukee River Headwaters Study Stakeholders Meeting February 26, 2007, Hampshire Village Hall

### Regionalization of model parameters for a flood-hazard study of the Kishwaukee Headwaters in Kane County, Illinois

#### Background

Building on the success of the flood-hazard study of Blackberry Creek watershed in Kane County, Illinois, the U.S. Geological Survey-Illinois Water Science Center and Kane County Division of Environmental Management (KCDEM) will be performing a flood-hazard study of the Kishwaukee River headwater streams.



KCDEM seeks smart watershed planning and growth in the watershed that will not increase flooding and water quality problems.

The headwater streams consist of three presently agriculture-dominated watersheds (Eakin, Coon, and Union) containing over 90 river miles. The existing floodplain maps are based on data from the early 1970's.

#### Goal

Up-to-date watershed models with refined hydrologic and topographic data sets will be used to generate floodplain and floodway maps for current conditions. These models and data sets can then be used as tools for watershed planning and growth.

# Approach

Information needed for model calibration and verification will be obtained by

- Retrieval and collection of hydrologic and hydraulic data
- Regionalization of hydrologic parameters and scientific analysis.

A verified modeling database containing all the data required in model development, calibration, and verification for three watersheds will be populated.

- Because this database will contain regional data, it will be transferable to other watersheds in Kane County and other counties in the region.
- The database will contain regionalized model parameters for model development, and historical events supplemented with remotely sensed data, as appropriate, for model calibration and verification.
- The data will be reliable, impartial, and accessible in the appropriate format for modeling applications as well as published and maintained in the USGS public databases.

## Collaborators

This project will be conducted through cooperation with Federal, State, County, municipal, and private agencies. The USGS has received data from many Kane County departments and the Illinois DOT. Also, consultants have provided copies of recent floodplain studies done in the study area, and the IDNR-OWR is surveying structures in the streams.

## Information we are seeking

To have the most up-to-date data to construct the models, we are seeking information about the following:

- As-built plans for structures
- Surveys of stream cross-sections
- Highwater marks from floods
- Inundation from floods
- Areas currently or soon to be under development
- Areas with a history of flooding

For additional information, please contact Elizabeth Murphy at (217) 344-0037 x 3057, [emurphy@usgs.gov](mailto:emurphy@usgs.gov); Tim Straub at x 3024, [tdstraub@usgs.gov](mailto:tdstraub@usgs.gov); or David Soong at x 3055, [dsoong@usgs.gov](mailto:dsoong@usgs.gov), or visit <http://il.water.usgs.gov>.

## Hydrological Study Activity in the Blackberry Creek Watershed, Illinois

### Background

The Blackberry Creek Watershed is a largely agricultural 73-square mile watershed located at the western side of Chicago metropolitan area, across Kane and Kendall Counties. Urbanization and recurring flooding in recent years has raised concerns in the future conditions of the watershed. The U.S. Geological Survey (USGS), Kane County Department of Environmental Management (KCDEM), and Kendall County and municipalities in Kendall County are collaborating to collect data and develop numerical models to understand the storm-runoff characteristics of the watershed. The results have been applied to delineate floodplains and floodways, and to analyze future conditions under to the projected land-use plans developed by the counties and municipalities, including detention requirements. The scientific database and models developed can also be used to study wetland protection alternatives and analyze water-quality conditions.

### Study Activities

- Created a Digital Elevation Model (DEM) from 2-foot contour elevation data (FEMA 37 compliant).
- Developed rainfall-runoff Hydrological Simulation Program-FORTRAN (HSPF) hydrologic model, and estimated flood profiles with detailed HEC-RAS hydraulic models.
- Developed 2-D FESWMS model to study the flood diversion at Jericho Lake and at East Run Tributary.
- Integrated the model results with simple querying, analysis, and display systems in ArcIMS.
- Analyzed the effectiveness of various release rates from detention basins at different locations in the watershed.

### Approach and Methodology

The USGS team analyzed hydrologic cycles of different land-uses and applied the results to investigate modifications in runoff processes due to land use changes within the watershed using the continuous simulation mode of HSPF. This study approach was data-driven. With more than 50 years of observed hourly meteorological data as input, an equivalent amount of long-term stream flow record was simulated at selected locations within the watershed. Streamflows and flow parameters needed in various watershed management analyses (peak-flow discharges, flow durations, low-

flows) can be derived from simulated streamflow records. The flood-frequency curves obtained from the simulated data at the USGS Yorkville streamflow station were comparable to those determined from observed streamflow data. Estimated flood-frequencies in ungaged areas inside the watershed also were evaluated. The continuous-simulation and flood-

frequency analysis methodology and carefully calibrated and verified models improved confidence in the estimated flows for the subsequent applications such as floodplain and floodway delineation, and watershed-scale stormwater management strategies.

The FESWMS model, also developed based on the DEM, has been applied to analyze the occurrence and magnitudes of flow diversions from Jericho Lake to the City of Montgomery, and from the East Run tributary to the Cherry Hills subdivision in the City of Aurora.

### What does the study demonstrate?

- State-of-art techniques been applied to improve the floodplain management strategies for watersheds under the stress of rapid urbanization.
- Calibration and verification of models were done with conventional approach using gaged data, and with NEXRAD rainfall and flood inundation photographs for ungaged areas.
- Fast and easy to access ArcIMS web page disseminates study results quickly and has proven to be useful to consultants and researchers who need flow data for their projects.
- A demonstration of collaboration among private, local, County, State (IDNR-OWR), and Federal (FEMA and USGS) agencies.

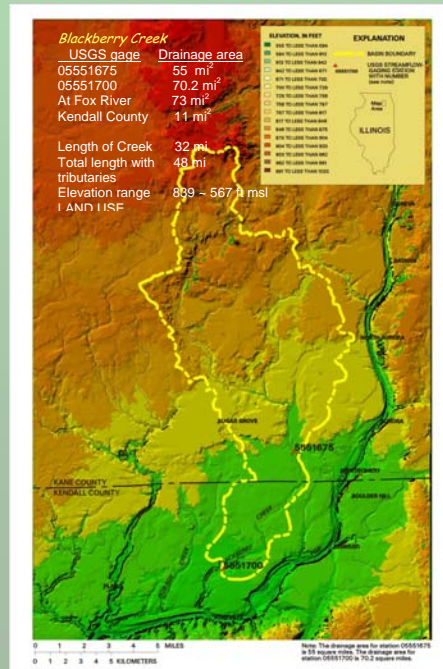
### Contacts:

For additional information please contact the following USGS personnel at 217 344 0037:  
 Bob Holmes, District Chief, ext 3005;  
 Audrey Ishii, Section Chief, ext 3026;  
 David Soong, Hydrologist, ext 3055;  
 Tim Straub, Hydrologist, ext 3024; or  
 Elizabeth Murphy, Hydrologist, ext 3057.

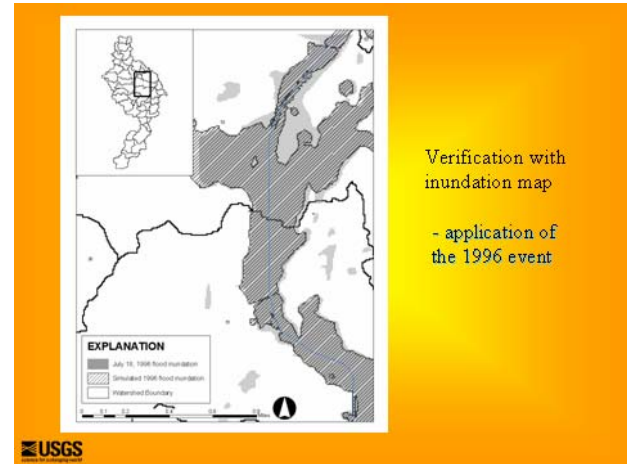
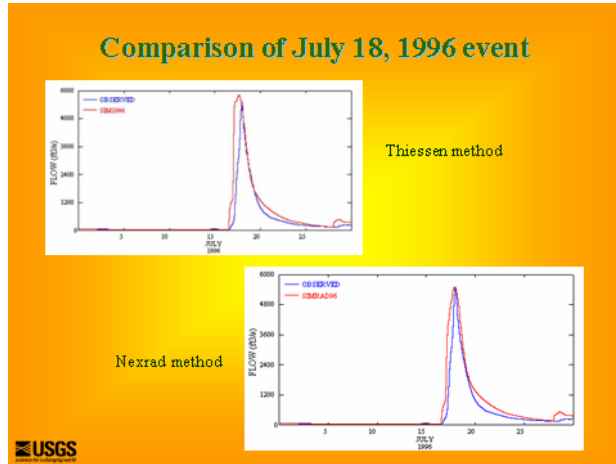
### Report:

Continuous hydrologic simulation and flood-frequency, hydraulics, and flood-hazard analysis of the Blackberry Creek watershed, Kane County, Illinois. URL:

<http://pubs.usgs.gov/sir/2005/5270/pdf/sir20055270.pdf>



## Model Calibration



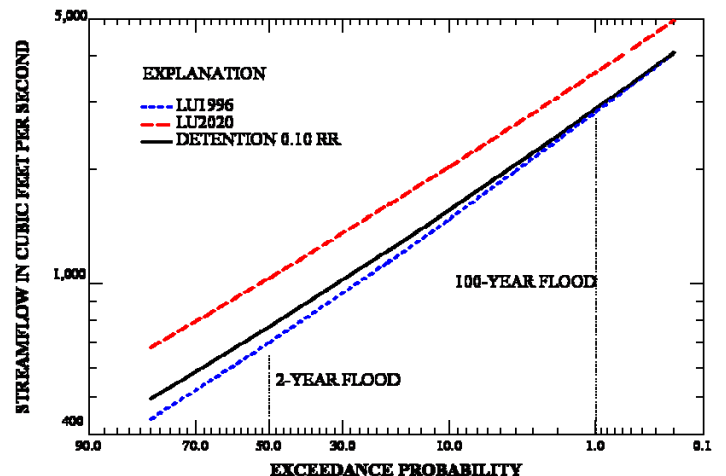
The figure on the left shows the model simulation of the peak flow of record (July 16-17, 1996 storm) using the Thiessen method with 2 raingages and with the NEXRAD rainfall input. The close match shown in the figure on the right between the photographed and simulated inundation inside the watershed (ungaged areas) reinforces confidence in the model calibration and verification procedures.

## Interactive Result Dissemination



The final study results are disseminated in an interactive map server. Showing in the figure above is an example of overlaying the 100- and 500-year floodplain boundaries on digital aerial photographs that enables visualization of flood hazards in the area of interest. The yellow lines in the figure are subbasin boundaries used in the analysis. There are other useful GIS layers and data query tools available. The URL for the Blackberry Creek watershed interactive map server is: <http://munster.er.usgs.gov/arcims/bbc>

## Tools for Understanding Effects of Development



Kane County managers can use the developed model to understand the effects of urbanization and stormwater facilities such as detention basins in different part of the watershed. The figure above shows the predicted flood-frequencies with two land-uses (based on the 1996 and projected 2020 land uses) and detention basins with release rate of 0.1 cubic feet per second per acre installed in the 2020 land-use conditions at the county line between Kane and Kendall Counties. Similarly many other management plans can be included and their effects evaluated at different locations in the watershed.