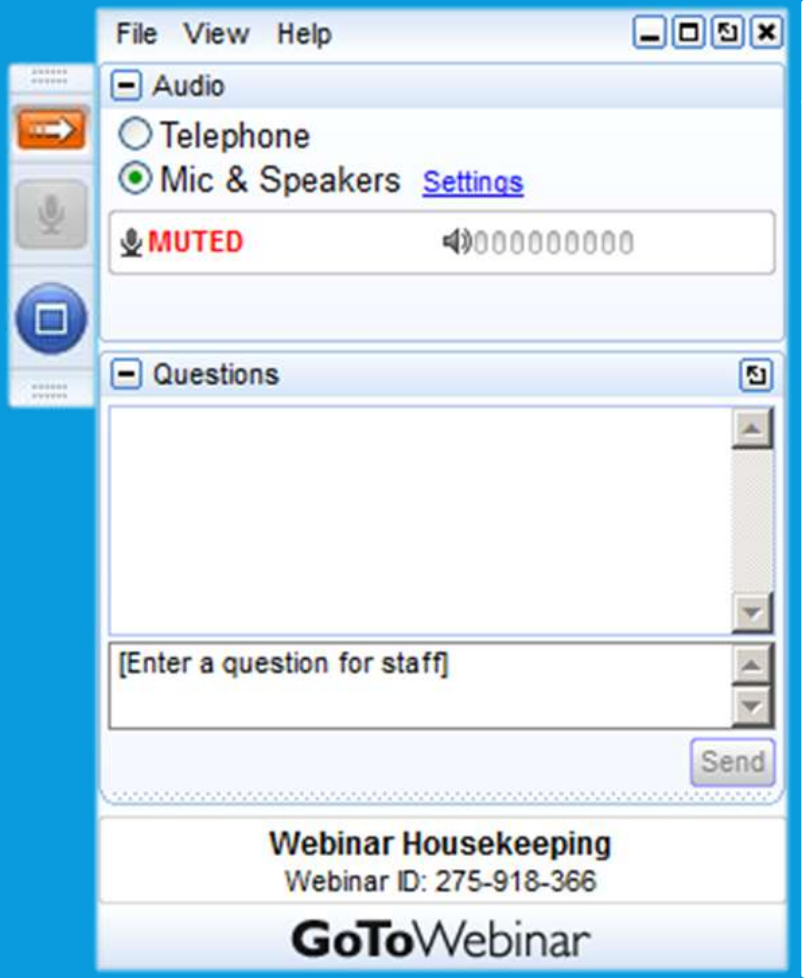
COOPERATING TECHNICAL PARTNER INFORMATION EXCHANGE

Hydrology Review - Coordinating with Federal Agencies

December 14, 2016

Association of State Floodplain Managers

AUDIO AND WEB SETTINGS



Your Participation

Open and hide your control panel using the red arrow button

Join audio:

- Choose “Mic & Speakers” to use VoIP
- Choose “Telephone” and dial using the information provided

Submit questions and comments via the **Questions** panel

AUDIO AND WEB SETTINGS

- All lines will be automatically be muted.
- Use the Question window in your webinar control panel to submit your question or comment to the ASFPM Organizer.
- Select questions will be read to the presenter and answered.
- Questions not asked during the webinar will be answered and made available in a follow-up email.

CONTINUING EDUCATION CREDIT LOGISTICS

- Certified Floodplain Managers (CFM®) are eligible for 1 Continuing Education Credit (CEC) for taking this training.
- You must register individually and indicate you are a CFM® at time of registration.
- Eligibility for CEC is dependent on your participation in poll questions and time spent viewing the webinar, as determined by the webinar software.
- Attending this training in a group setting or only viewing the recording is NOT eligible for CEC.

AGENDA

- Introduction - Alan Lulloff
- Minnesota Hydrology Review Committee - Rita Weaver
- US Army Corps of Engineers, the federal perspective - Terry Zien
- Indiana Coordinated Discharges - Dave Knipe
- Indiana Peak Discharge Determination System - Dave Knipe
- Questions/Discussion

ASFPM MAPPING AND ENGINEERING STANDARDS COMMITTEE **COOPERATING TECHNICAL PARTNER SUB-COMMITTEE**

Co-chairs:

- Amanda Flegel, PE, CFM; Illinois State Water Survey
- Thuy Patton, PE, CFM; Colorado Water Conservation Board

Goals:

Identify common concerns, provide opportunities for information exchange, identify training needs, promote and document the value of CTPs

FLOOD MAPPING - COMPONENTS

- Hydrology - Flood Discharges
- Hydraulics - Flood Elevations
- Flood Mapping - Areas Inundated

FLOOD MAPPING - UNCERTAINTY

- Hydrology: +/- 30 % or more
- Hydraulics: +/- 1 to 2 feet
- Flood Mapping: +/- ½ contour interval

STATE LEGISLATIVE REVIEW REQUIREMENTS – WI EXAMPLE

WI Chapter 87.30

"*no floodplain zoning ordinance may be enacted unless … the department (WI DNR) ensures that the studies are reasonable and accurate.*"

STATE LEGISLATIVE REVIEW REQUIREMENTS – MT EXAMPLE

MT 76-5-202

Regarding flood designations:

"These designations must be based upon reasonable hydrological certainty."



Minnesota Hydrology Reviews

Rita Weaver, P.E., CFM

Minnesota Floodplain Program

- Out of Minnesota's 87 counties:
  - 40 DFIRM counties
  - 13 preliminary DFIRM counties
  - 20 counties have no maps or paper maps
- 16,458 Zone A miles and 5,168 Zone AE miles
- MnDNR has about 7 FTE's in the floodplain program
- DNR staff do Zone A modeling, help with appeals, training to county/local staff, LOMR reviews, hydrology review

Minnesota IAHRC

Inter-agency Hydrology Review Committee

- Requires review of all proposed changes in hydrology
- Comprised of members from the DNR, USACE, USGS, and NRCS
- An approval letter from the IAHRC will take place of FEMA's review
- IAHRC was formed because we felt that local knowledge was necessary

Examples – Sakatah Lake

- Lake in southern Minnesota
- Original hydrology calculations were based on peak discharges during the 24-hour even from all tributaries
- In Minnesota, lakes are usually based on volume, not peak flow
- So the applicant needed to consider longer return periods/lake volume/etc.

Examples – Cannon River

- Three USGS gages in the Cannon River Watershed: two on the Cannon River, one on the Straight River – most downstream has the longest history
- Original applicant wanted to transfer the data from the most downstream gage, but significant storage along the Cannon affects peak flows
- Downstream gage can't be applied everywhere in the watershed

Examples – Valley Branch Watershed District

- Many land locked basins
- Original submittal used continuous modeling based on rainfall data from 1950 to 1984 and from 2007 to 2013
- Did not include wet period in the 1990's, including the July 1987 "super storm"
- Updated continuous modeling showed several feet of increase in some of the landlocked areas

US ARMY CORPS OF ENGINEERS, THE FEDERAL PERSPECTIVE



- Speaker: Terry Zien



Hydrology in Indiana

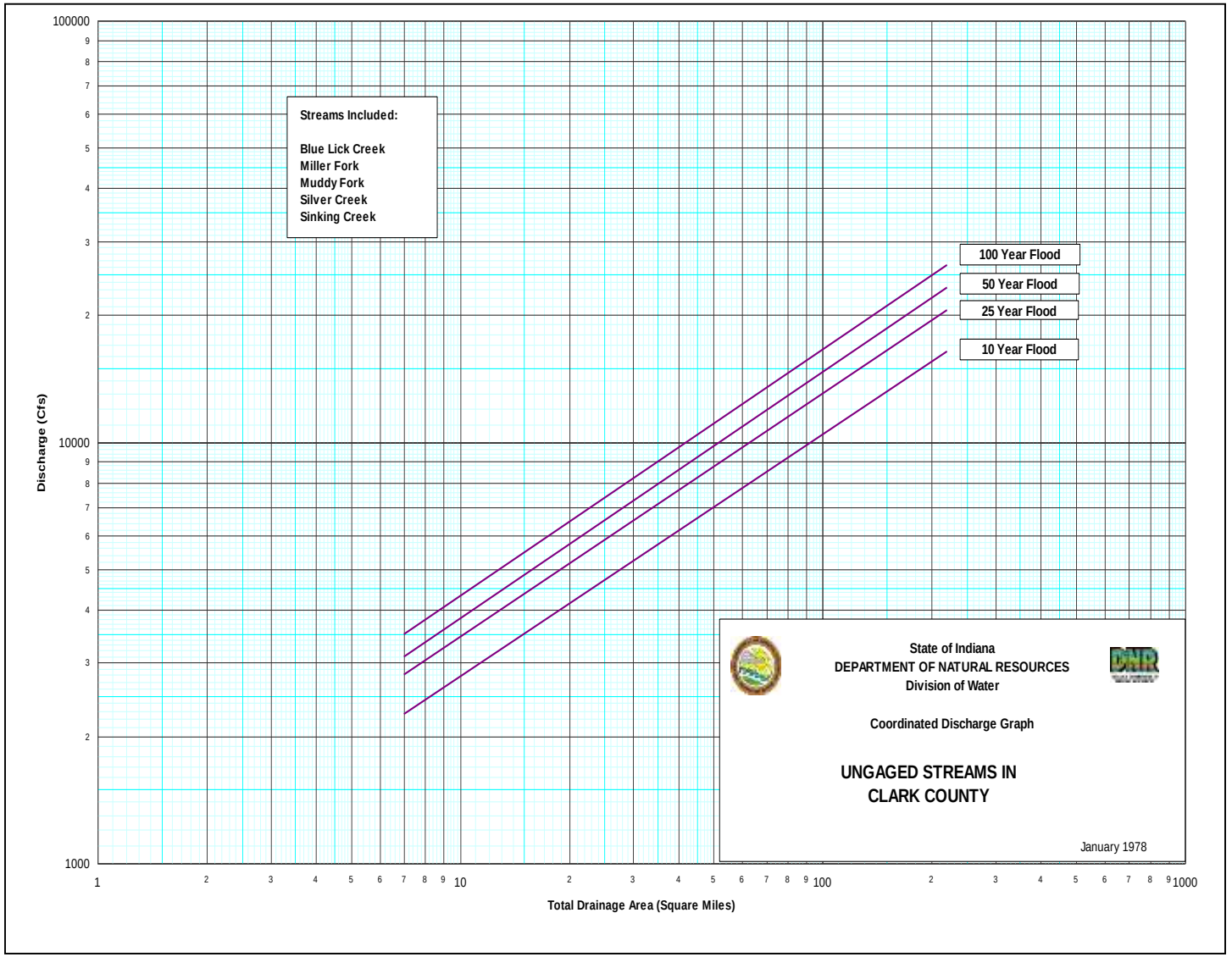
David Knipe
Engineering Section Manager



Coordinated Discharges

- MOU signed by the IDNR, Corps of Engineers, USGS and NRCS (1976)
- Review process for agreeing to use the same discharges for a stream
- Discharges normally plotted as a straight line on log-log graph
- Coordinated Discharges accepted by FEMA used for Flood Insurance Studies
- Included in USGS Streamstats

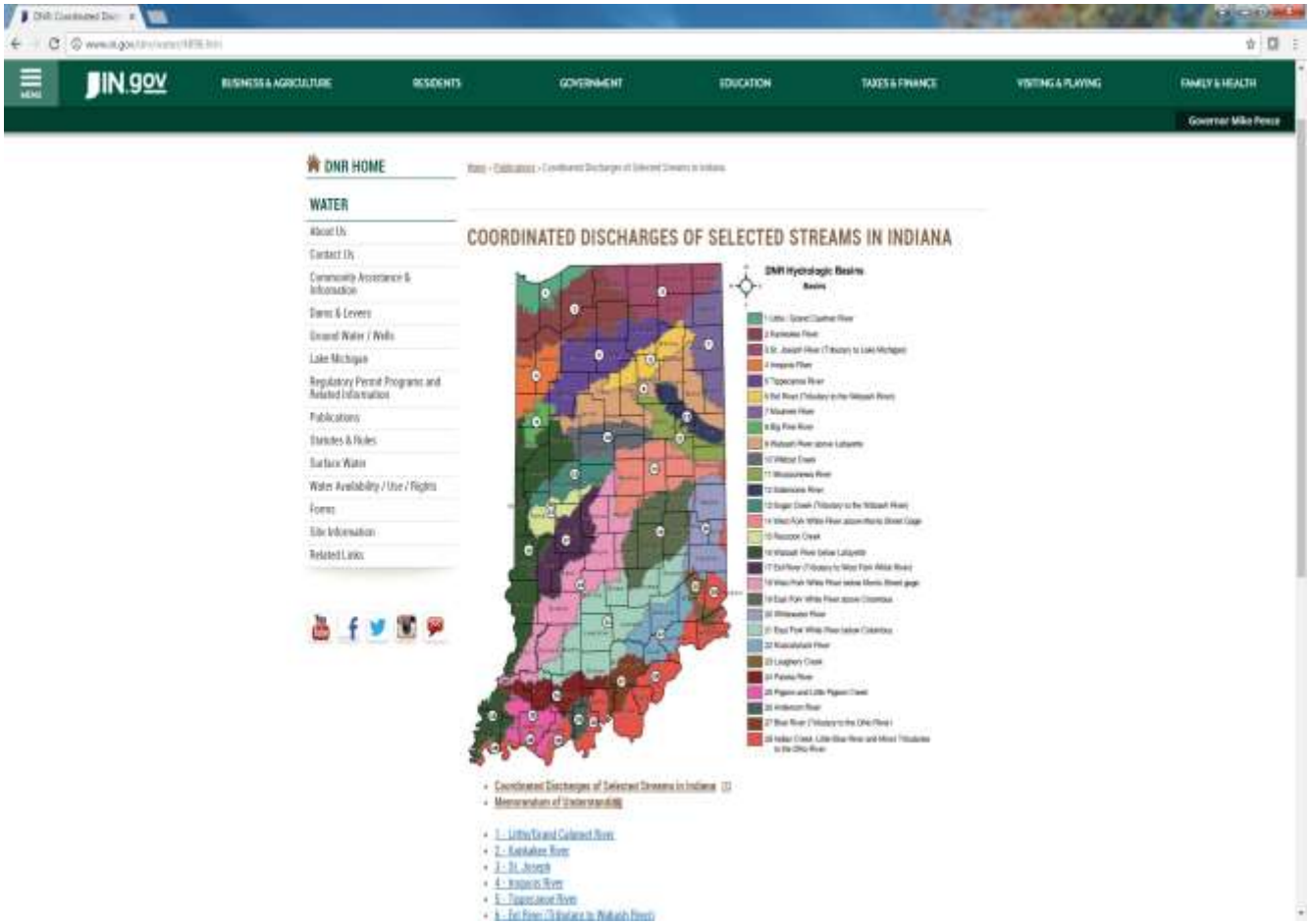

DNR
INDIANA DEPARTMENT OF NATURAL RESOURCES


Streams Included:
Blue Lick Creek
Miller Fork
Muddy Fork
Silver Creek
Sinking Creek
100 Year Flood
50 Year Flood
25 Year Flood
10 Year Flood
Discharge (Cfs)
100000
10000
1000
1
10
100
1000
Total Drainage Area (Square Miles)
State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Coordinated Discharge Graph
UNGAGED STREAMS IN
CLARK COUNTY
January 1978

INDIANA DEPARTMENT OF NATURAL RESOURCES

in.gov/dnr/water/4898.htm

floodmaps.in.gov





The Indiana Peak Discharge Determination System (IPDDS)

- Application set for internal DNR use, adapting for general use
- Compiles 100 year Peak Discharges from a number of sources, plots on log-log plot using Excel
- Uses Streamstats for computation of watershed parameters


DNR
INDIANA DEPARTMENT OF NATURAL RESOURCES
INDIANA DEPARTMENT OF NATURAL RESOURCES · DIVISION OF WATER


Indiana Peak Discharge Determination System
Indiana Department of Natural Resources DNR
Jump to a county
Select your county from below
Adams
Have questions? Check out the Using the IPPDS tab.
Click and drag your mouse across the map to pan.
< Previous Tips
Next Tips >
Map
Using the IPPDS
Interpreting Results
Submitting to DNR
Resources
Layers +
Legend
Help
Discharge Determination
Please zoom in to view StreamStats stream layer.
What is the Discharge Determination System?
This is a system to generate flood frequency discharge values for streams in Indiana. For information on the determination process and interpreting the results, please review the contents of the tabs at the left. Experience in flood frequency analysis is necessary for the use of this system. For general floodplain information in Indiana, please visit the Indiana Floodplain Management Portal.
Stream Name: Buck Creek
Select Stream Name: Buck Creek
If needed, select the correct stream name from the list above. Selection of a name there will override the stream name from the map.
Click the button below to request a discharge determination on the stream at the location where the red dot is shown on the map.
Request Discharge Determination
Determination succeeded for Buck Creek
Download Determination Results
Currently centered on: Marion County



Indiana Peak Discharge Determination System

Indiana Department of Natural Resources DNR

Jump to a county

Select your county from below

Adams

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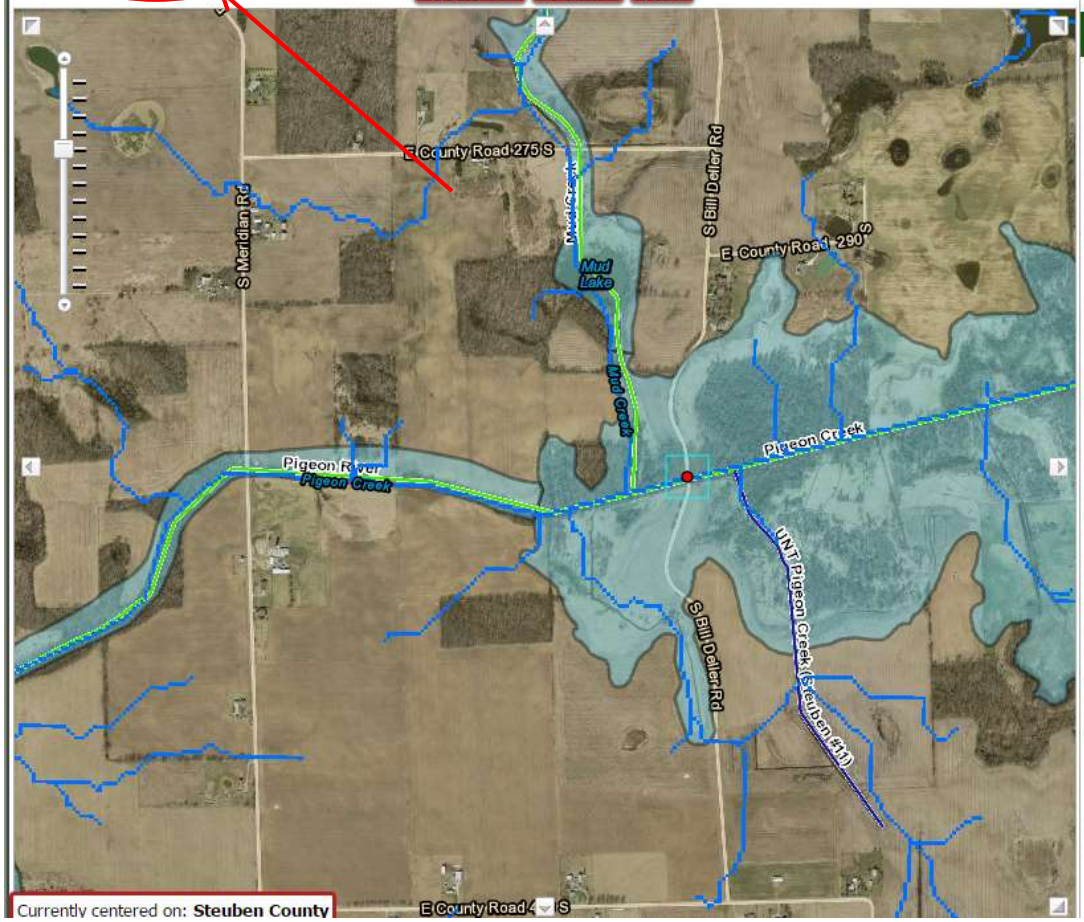
Click and drag your mouse across the map to pan.

< Previous Tips | Next Tips >

Minimize

Map | Using the IPPDS | Interpreting Results | Submitting to DNR | Resources

Layers | Legend | Help



Currently centered on: **Steuben County**

Discharge Determination

Click as close as possible to a StreamStats stream to request a discharge determination.

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Stream Name: Pigeon Creek

Select Stream Name:

If needed, select the correct stream name from the list above. Selection of a name there will override the stream name from the map.

Click the button below to request a discharge determination on the stream at the location where the red dot is shown on the map.

Request Discharge Determination



Using the IPDDS

- Zoom into desired discharge location
- Click on a blue square representing the USGS Streamstats layer
- A box will flash and a stream will be selected and indicated on the right side of the screen
- If incorrect another stream name can be chosen in the drop down box



How does IPDDS work?

- Click the “Request a discharge determination” button to run the program (can take a few minutes).
  - The program sends a request to the Streamstats server
  - Then queries the IDNR Unity databases for hydrologic information
  - Once complete a zip file can be downloaded



Zip file contents

- DDL.xls, spreadsheet to display the output graphically
- Scratch1.csv and Scratch1.txt, output from the IDNR Unity query
- Streamstats.xml, output from Streamstats request
- GWS_FINAL.shp, ESRI shapefile of the request point



Indiana Peak Discharge Determination System

Indiana Department of Natural Resources DNR

Jump to a county

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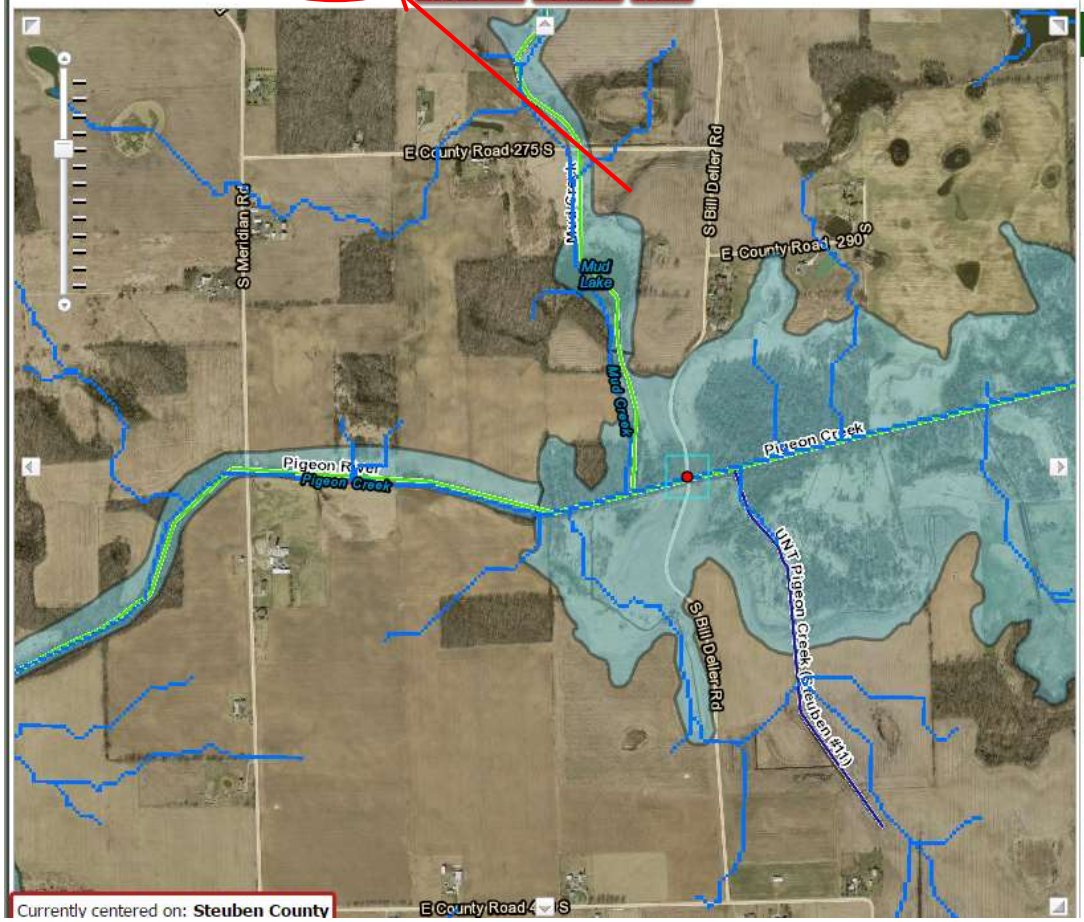
Click and drag your mouse across the map to pan.

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Request Discharge Determination



DDL spreadsheet features

- Used to review and analyze the data returned from the IPDDS run
- Formatted to accept input from the raw data files (Scratch & Streamstats)
- Provides plotting and analysis for review of the output
- Works with any version of Excel after 2007



4 DDL spreadsheet tabs

- Request Form
- Results
- Log-Log Plot
- Help



Request Form

- Has basic information including stream name, county, PLSS and UTM coordinates
- A location description can be entered by the user
- An area to enter data for a request is provided and space for IDNR staff review and sign off on a request



Request Form cont'd

- Regression region
- Contributing Drainage Area (non-contributing drainage is subtracted)
- Slope (10-85)
- % Water
- % Urban
  - Background info at streamstats.usgs.gov



State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Indiana Peak Discharge Determination System

Import Data from scratch.csv

Stream Name	Little Sugar Creek			
Location				
at/near			Section	36
Town	Smartsburg		Township	19N
County	Montgomery		Range	4W
Regression Regior	4		HUC 12	51201100302
Contributing DA	40.80	mi²	DNR Basin	13
Slope (10-85)	9.31	ft/mi	Sugar Creek (trib to Wabash River)	
%Water	0.8		UTM East	515625
%Urban	0.2		UTM North	4433415
			UTM Datum	

Comment(s)

Name of Requestor
Name of Firm
Address
Email Address
Phone No.



Results tab

- Regression equation (Purdue 2004)
- Identical streams (IDNR)
- Similar streams (IDNR), top 10
- Bulletin 17B of nearby gaged streams
- Nearby Coordinated Stream, top 5
  - http://www.in.gov/dnr/water/4898.htm
- User Input Discharge Values



Results tab analysis

- Right side has space to toggle on or off plotting the points and using for fit line



State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Indiana Peak Discharge Determination System

Stream Name	Little Sugar Creek
Location	0

Regression Equations (Purdue 2004)	Discharge (cfs)	Plot?	Compute?
100 Year Discharge	4950	Y	Y
10% Confidence Interval	3370	Y	
90% Confidence Interval	7290	Y	

Identical Streams from IDNR Database	Req Date	EffDA (Mi²)	Slope	Discharge (cfs)	Plot?	Compute?
Little Sugar Creek	10/14/1997	39.85	8.91	6000	Y	Y
Little Sugar Creek	12/27/2007	9.14	11.96	2500	Y	Y

Similar Streams from IDNR Database	Req Date	EffDA (Mi²)	Slope	Discharge (cfs)	Plot?	Compute?
Little Sugar Creek	10/14/1997	39.85	8.91	6000	Y	Y
Little Sugar Creek	9/7/1995	44.03	9.22	6450	Y	Y
Walnut Fork Sugar Creek	7/7/1995	44.80	9.41	6500	Y	Y
Walnut Fork	3/15/1988	42.50	8.50	7500	Y	Y
Walnut Fork Sugar Creek	5/17/1996	42.77	8.21	6200	Y	Y
Walnut Fork Sugar Creek	4/14/1997	33.50	7.41	5400	Y	Y
Black Creek	5/6/1996	31.00	10.86	5800	Y	Y
Big Raccoon Creek	3/13/1998	49.85	6.81	8000	Y	Y
Big Raccoon Creek	5/8/1996	33.76	5.60	5200	Y	Y
Big Raccoon Creek	6/15/1985	56.10	7.41	10500	Y	Y

Bulletin 17B Analysis of Nearby Gaged Streams		EffDA (Mi²)	Discharge (cfs)	Plot?	Compute?
3339280	Prairie Creek Lebanon Indiana	33.20	5420	Y	Y
3335679	Little Pine Creek Green Hill Indiana	42.30	12200	Y	Y
3339400	Sugar Creek Tributary Garfield Indiana	1.20	666	Y	Y
3340800	Big Raccoon Creek Fincastle Indiana	130.00	29600	Y	Y
3339500	Sugar Creek Crawfordsville Indiana	509.00	32000	Y	Y

Nearby Coordinated Discharges	Discharge (cfs)	Plot?	Compute?
Sugar Creek - Boone County FIS (May 1979 & Feb. 1984)	7630	Y	Y
Prairie Creek (2009)	5680	Y	Y
Wea Creek & Little Wea Creek (May 1978)	6570	Y	Y
Dry Branch (April 2008)	15800	Y	Y
Unnamed Tributary Dry Branch	11900	Y	Y

User Input Discharge Values	EffDA (Mi²)	Discharge (cfs)	Plot?	Compute?

Discharge From Power Equation Fit Line	EffDA (Mi²)	Discharge (cfs)
Little Sugar Creek	40.80	7300

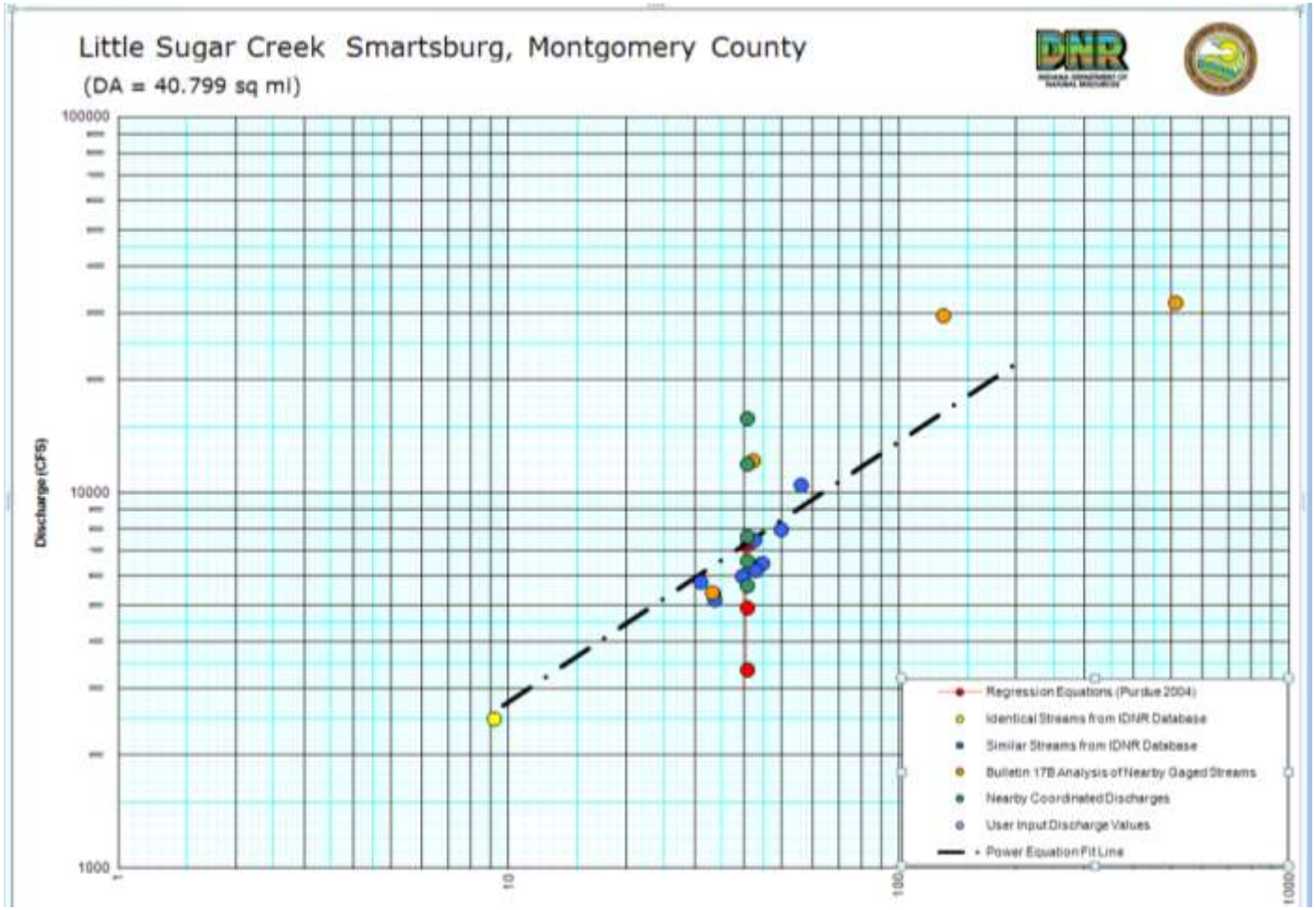


Log-Log Plot

- Results tab data presented as a log-log plot of drainage area vs. discharge
- Best fit line presented
- Plot allows user to visually see the distribution of points and review an appropriate value to use
- Adjusting the plot for optimal viewing is in help tab

INDIANA DEPARTMENT OF NATURAL RESOURCES







Making final determination

- Requires a background in flood hydrology and experience in peak discharge determinations
- All methods should be evaluated for appropriateness
- Outliers should be removed
- Use a conservative estimate to avoid an inadequate design and more frequent flood damages



Indiana Peak Discharge Determination System

Indiana Department of Natural Resources DNR

Jump to a county

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Adams

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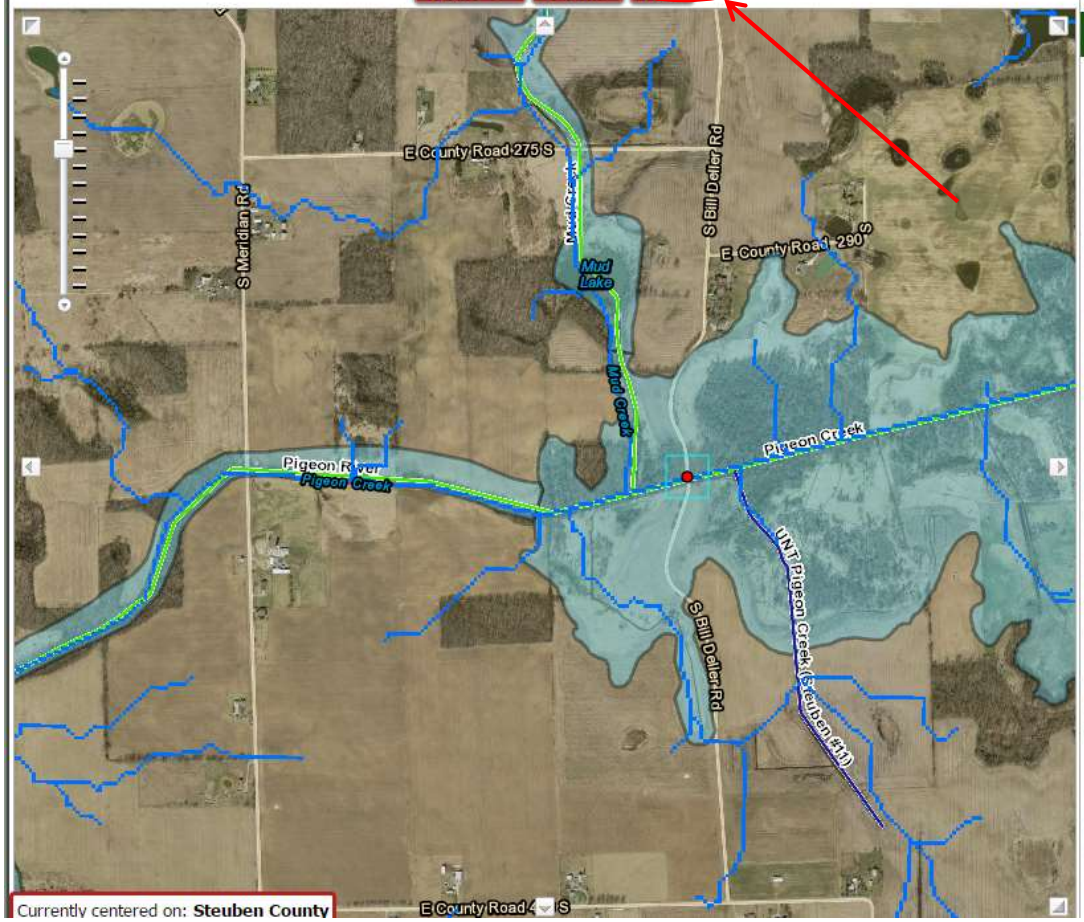
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CLOSING COMMENTS

- To suggest future CTP web meeting topics contact Alan Lulloff at *alan@floods.org*
- … or type in suggested topics in Questions panel today
- CFM CECs through ASFPM will be automatically applied. If you require a Certificate of Attendance, please contact *gisjason@floods.org*
- Follow-up email will be sent in about a week

Thank You for Joining Us!