



COOPERATING TECHNICAL PARTNERS
FEDERAL EMERGENCY MANAGEMENT AGENCY
State of Illinois Risk MAP

Illinois CTP Collaboration Success

FEMA Region 5

CHALLENGE

The Illinois State Water Survey (ISWS), part of the Prairie Research Institute at the University of Illinois, is a FEMA Cooperating Technical Partner that has been conducting all components of flood mapping in Illinois since 2005. Flood engineering studies can be time consuming and expensive. Standard approaches were limiting the number of stream miles that could be mapped with the funding available.

SOLUTION

To improve efficiencies in flood engineering and mapping, ISWS has been developing automated engineering tasks associated with the FEMA flood mapping process. Automated processes have been developed to extract flood flows from USGS's stream stats system and ArcMAP ModelBuilder processes that automate the flow path lines and cross section setup for the hydraulic modeling. During the last several years that ISWS has been developing its customized approach to this work, several collaborative relationships with other Cooperating Technical Partners (CTP) have developed.

In 2015, ISWS co-presented with fellow CTP agency Indiana Department of Natural Resources (INDNR) and FEMA headquarters in the "Cooperating Technical Partner Information Exchange: First Order Approximations" webinar. ISWS walked through the details of their automated engineering workflow, including the debut of a hydrology automation tool developed by ISWS that interacts with the United States Geological Survey (USGS) StreamStats Web Services. The presentation yielded a number of follow-up conversations with webinar attendees, including CTP colleagues in FEMA Region 9, who were provided the hydrology tool to evaluate for their engineering modeling activities.

At the 2016 ASFPM annual conference in Grand Rapids, ISWS presented a session titled "DIY FOA for the CTP", describing the workflow steps and in-house tools being used to model and map automated H&H evaluations. Several follow-up conversations with session attendees ensued, leading to an opportunity for ISWS to share their hydrology automation program (SHAMP) and their custom ArcMAP ModelBuilder toolbox with a CTP colleague in Wisconsin, who is beginning to develop similar studies for their state.

OUTCOME

Upon testing the provided ISWS tools, the CTP colleague discovered that an update to the USGS StreamStats webtool was causing SHAMP results to be shifted one recurrence interval. The sharing and testing enabled this issue to be found early after the StreamStats update and corrected early in project mapping processes. Wisconsin is in the process of initiating an automated engineering project. Having the code developed by the Illinois State Water Survey will speed up and improve the processes that will be developed.

BENEFITS

Sharing tools with other CTP colleagues resulted in collaborative relationships that benefited all parties involved. The external review helped improve the hydrology automation program and sharing the hydrology tool improved efficiency of the automated engineering process for multiple CTP colleagues. The fact that programming code developed by Cooperating Technical Partners is not proprietary and are freely shared helps reduce mapping costs and improves innovation among Mapping Partners.

This project involved the following Risk MAP phases:

- Discovery
- Data Development and Sharing
- Proposed NFIP Map Changes and Impacts

RISK MAP GOALS ADVANCES

The Risk MAP goals that were advanced through this project included:

- Increased Deployment

StreamStats Hydrology Automation Program

Note: This program will download drainage area, flows, and the zip file containing watershed shapefiles for a specific location. The program will also unzip shapefiles into the appropriate file. User will need to manually add shapefiles to GIS.

Green cells: user-enter information
 Orange cells: do not write or delete. These contain hidden formulas. Only copy from these cells as instructed.
 White cells: Program will write to these cells.

Non-Illinois users: Change web address in orange cells to your 2 letter state abbreviation

Instructions for StreamStats Hydrology Automation Workbook:

Before using this workbook, a shapefile of hydrology points should be created in GIS. The attribute table for hydrology points should be exported to a blank spreadsheet.

1. Perform a "Save as" on template workbook (save as a macro-enabled workbook)
2. In Sheet1, copy and paste Object ID, Latitude, Longitude, Stream Name and Reach name into columns A-E. Object ID should be a distinct identifier for the stream and reach. All columns must be populated.
3. In Sheet 1, Copy contents from Column F and Paste Special - Values into Column G. (Data in Column F is invisible but will paste visible in Column G)
4. Edit the green boxes in cells M4, M8, and M11 of this "Instructions" sheet. Destination Filepath is where you want the watershed shapefiles to be located. Source filepath is where your files automatically download (eg: C:\Users\userid\Downloads). "Start Streamstats at row" will be 2 unless you are trouble-shooting and starting at a different row.
5. Click button below to begin macro. This will take approximately 5 minutes for each hydrology point.

Automate StreamStats

Destination Filepath:
 C:\Users\lemilyp\Desktop\Test

Source filepath:
 C:\Users\lemilyp\Downloads

Start Streamstats at row:
 2

Troubleshooting:

1. If the StreamStats program stalls, end the macro. Adjust cell M11 for the row after which the program stalled. Click the "Automate StreamStats" button again.
2. Sometimes StreamStats cannot find the stream. In this case, the row will not populate correctly and you will need to manually obtain data.
3. SHAP tool must be active workbook while program is running.

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LESSONS LEARNED

Upon investigating the SHAMP tool bug, ISWS established more robust code and discovered updates to the USGS StreamStats web service features that had not been previously available. Without this collaboration, ISWS would not have discovered and capitalized on these USGS changes as quickly. Technology in the techniques of automated engineering is evolving. Working together Mapping Partners can cover the gaps between FEMA automated engineering requirements and publicly available technology.

RESOURCES

2016 ASFPM Conference Presentation

Grand Rapids, MI

Session B8: Addressing Unmapped Areas

http://www.floods.org/Files/Conf2016_ppts/B8_Heistand.pdf

USGS StreamStats Version 3.0 Web Services

<http://streamstatsags.cr.usgs.gov/webservices/>

CONTACT INFORMATION

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