

An aerial photograph showing a large area of flooding. A house is surrounded by water, and the surrounding fields are also inundated. The image is framed in a circular shape.

STATEWIDE HAZUS FLOOD ANALYSIS

Presented by:
The Polis Center





Overview:

- Background
- Purpose
- Data and Methods



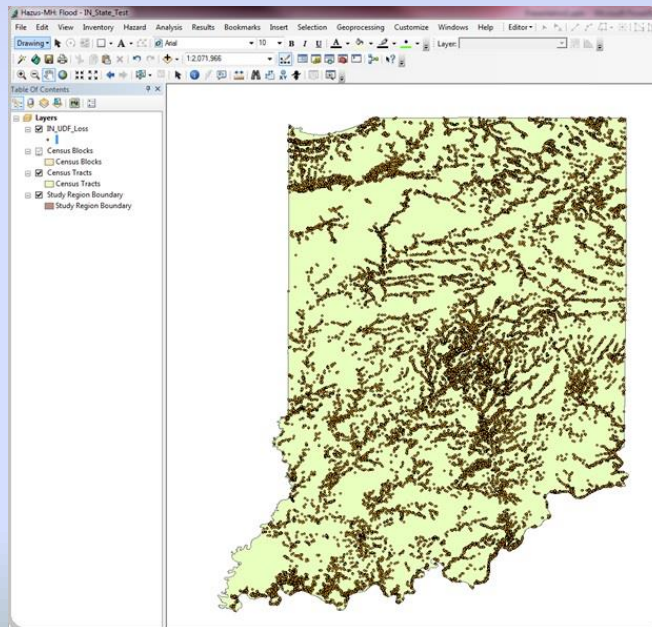
BACKGROUND

- ❖ Site-specific/Point-based flood analysis for Indiana State
- ❖ Eliminate census block level data in Hazus and substitute with local data to improve accuracy of model predictions
- ❖ Loss estimation is dependent upon spatial accuracy of the points and the flood depth grids
- ❖ Depth of the water in relation to the structure



OBJECTIVE

Estimate structural building losses for the entire state
using 100-year DFIRM and 10 m DEM





HAZUS DATA

- Essential Facilities (E.g., Police Stations),
- Agricultural Products (E.g., Corn),
- Vehicles
- High Potential Loss Facilities
- Transportation
- Utilities

- Boundary
GBS
- State
 - County
 - Tract
 - Blocks



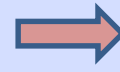
Perform point-based
analysis in **any part of
the state** or the entire
state



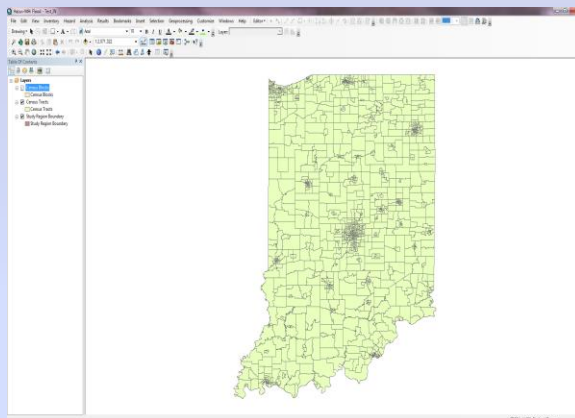
Aggregation time
is reduced to 5 mins



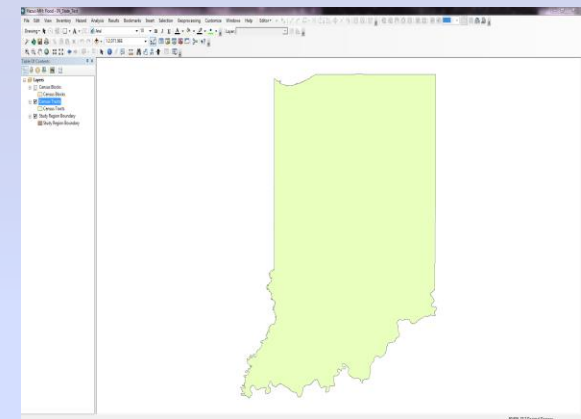
ADVANTAGES



**Processing
time/Analysis time**
is reduced by
approx. 8 hours per
study region



Counties, Tracts and
Blocks



State

> 1 hour ————— Aggregation time ————— 5 mins

> 8 hours ————— Analysis time ————— ~10 mins



Delete Census Block level data

Reduce aggregation time and analysis time

- ❖ Agricultural Products (E.g., Corn),
- ❖ Vehicles
- ❖ High Potential Loss Facilities
- ❖ Transportation
- ❖ Utilities

Define Study Region Aggregation Level- States/Counties/Tracts/Blocks

Geometry of county, tract and block aligned with the state boundary

- ❖ Enable statewide analysis of Essential Facilities

Analysis

Enhanced Quick Look using 10 m DEM and 100-Year flood boundary (DFIRM)

Import Essential Facilities



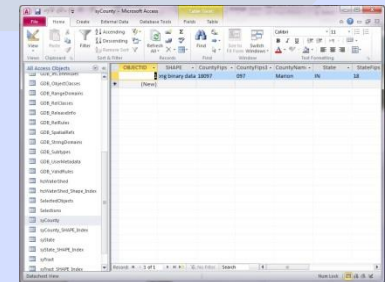
Delete Census Block level data

(Reduces aggregation time and analysis time)

- ❖ Agricultural Products (E.g., Corn),
- ❖ Vehicles
- ❖ High Potential Loss Facilities
- ❖ Transportation
- ❖ Utilities

Delete records geodatabase

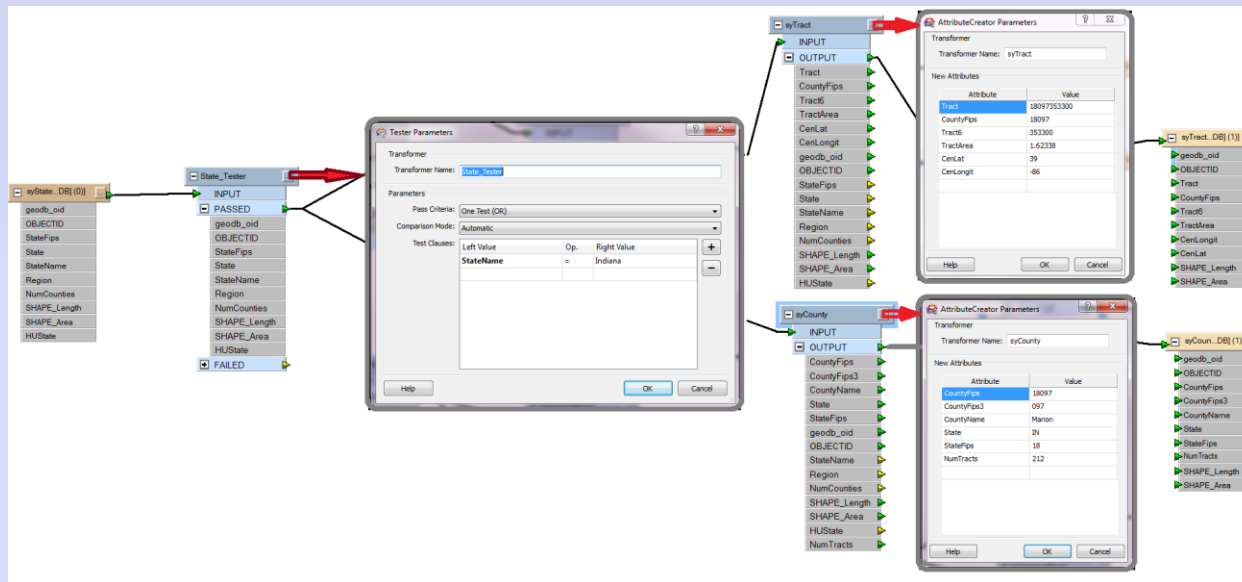
CDMS (Comprehensive Data Management System)
Delete statewide history and the databases





Geometry of county, tract and block aligned with the state boundary

FME tool



Source data - **Boundarygbs** file
Source file : syState
Destination data- **Boundarygbs** file
Destination file : syTract and syCounty

Select - Indiana

Create attributes for Tract and County- having only one record
Note: do not leave the fields blank

Link the fields to the destination fields
Shape area and Shape length from the source files



Counties, Census Tracts and Blocks
feature classes in the Hazus Boundary
geodatabase

UPDATED TO

One county, one tract and one block with the
'State' shape area and shape length

OBJECTID	SHAPE	Tract	CountyFips	TractFips	TractArea	CenLongit	CenLat	SHAPE_Leng	SHAPE_Area
1	mg binary data 0229000100	02290	000100	105193.5	-144.44951897	66.856879805	35.0782347683	21.647852555	
2	mg binary data 0229000200	02290	000200	104180.4	-150.87280641	66.0453126443	43.510833891	20.7588989959	
3	mg binary data 0229000300	02290	000300	46966.77	-142.37628192	63.8557961406	20.2618274747	8.4204604242	
4	mg binary data 0229000400	02290	000400	14868.71	-145.26217551	63.9356100962	14.565042435	3.72679980171	
5	mg binary data 0229000500	02290	000500	2667.75	-146.29642684	63.922402785	1.75994104870	0.49094675235	
6	mg binary data 0209000100	02090	000100	1.55583	-147.7176522	64.8404377339	0.0893115557	0.0002957939	
7	mg binary data 0209000200	02090	000200	4.62540	-147.75748940	64.836038227	0.1468035290	0.00087975214	
8	mg binary data 0209000300	02090	000300	3.11667	-147.72578609	64.8286596827	0.1249502776	0.0005625262	
9	mg binary data 0209000400	02090	000400	2.71613	-147.6829512	64.845943227	0.1054628594	0.0001161811	
10	mg binary data 0209000500	02090	000500	4.14415	-147.73593019	64.8512140954	0.20869042571	0.0007888921	
11	mg binary data 0209000600	02090	000600	5.01789	-147.78020391	64.853454251	0.1519079185	0.0009505702	
12	mg binary data 0209000700	02090	000700	5.23788	-147.80186214	64.831828927	0.1797950445	0.000995153	
13	mg binary data 0209000800	02090	000800	4.31893	-147.84910809	64.841291708	0.1519681512	0.0008212829	
14	mg binary data 0209000900	02090	000900	84.2425	-148.00501654	64.7922102076	0.8536420771	0.0199745554	
15	mg binary data 0209001000	02090	001000	49.9376	-147.78925991	64.804596045	0.6134965124	0.00948740185	
16	mg binary data 0209001100	02090	001100	3132.19	-147.65580712	64.511054013	5.5928619984	0.5807303485	
17	mg binary data 0209001200	02090	001200	61.0039	-147.57021129	64.886794978	0.8198765311	0.0116253038	
18	mg binary data 0209001300	02090	001300	81.4189	-147.77148785	64.8936025960	0.8467961941	0.0152343556	
19	mg binary data 0209001400	02090	001400	83.0232	-147.47613788	64.7910219781	0.84421257802	0.0176525945	
20	mg binary data 0209001500	02090	001500	128.513	-147.34561657	64.7746125118	1.30341812017	0.02438484545	
21	mg binary data 0209001600	02090	001600	24.7836	-147.35641851	64.7534035588	0.6489532570	0.0048996040	
22	mg binary data 0209001700	02090	001700	3550.89	-145.6480951	64.5657620885	8.62568807497	0.6687116412	
23	mg binary data 0209001800	02090	001800	1156.84	-146.46729727	64.6876635405	2.62936820489	0.2181427119	
24	mg binary data 0209001900	02090	001900	10770.39	-146.48548069	64.98442175	13.236654117	1.0600757891	
25	mg binary data 0229000100	02290	000100	88320.3	-156.23297426	65.3412071584	17.1483119017	17.1211961096	
26	mg binary data 0229000100	02290	000100	1194.7	-135.33779265	59.5585213818	1.9876807826	0.19078841962	
27	mg binary data 0223200200	02232	000200	4.88183	-135.88859095	59.398706463	0.1618815687	0.0007756194	
28	mg binary data 0217000100	02170	000100	287.216	-148.1786757	61.767280264	1.2875536580	0.06617650201	
29	mg binary data 0217000400	02170	000400	1844.19	-145.73506094	61.817701627	3.4649918035	0.3158212021	

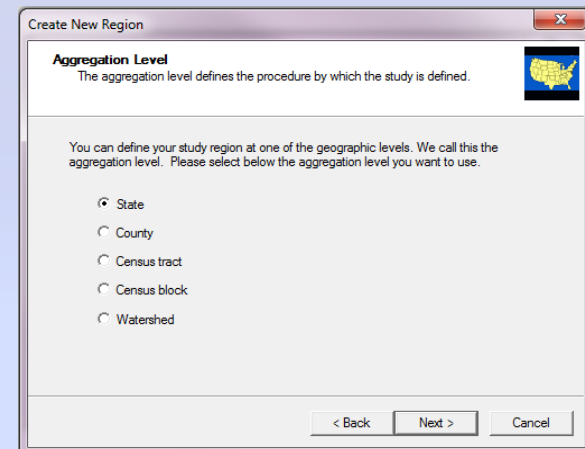
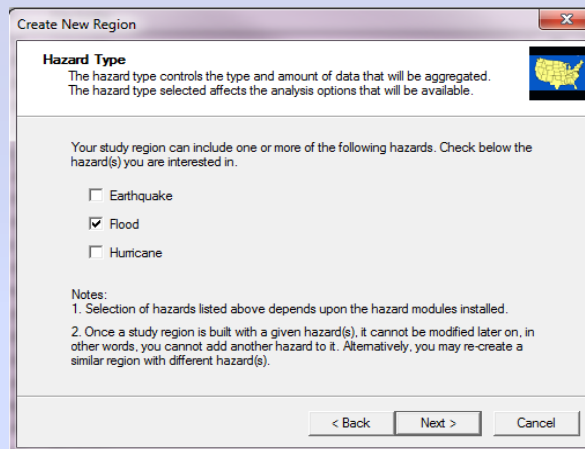
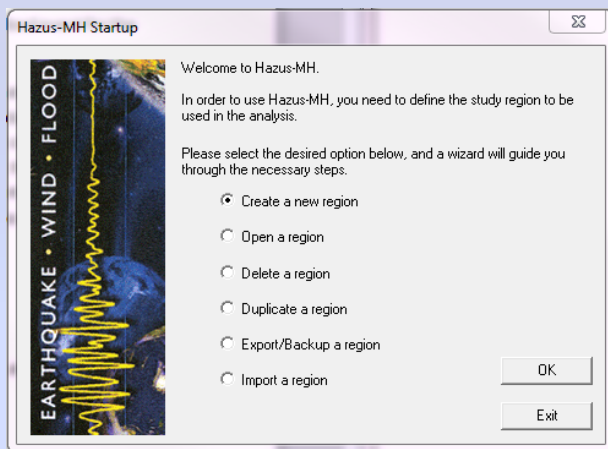
OBJECTID	SHAPE	StateFips	State	StateName	Region	NumCounty	SHAPE_Leng	SHAPE_Area
15	mg binary data 18	IN	Indiana		0	9	17.3353159312	9.87209700351

OBJECTID	TractFips	TractArea	NumAggrBo	CenLat	CenLongit	Length	SHAPE_Leng	SHAPE_Area
IN1	050100	90	100	41	-85	10	17.3353159312	9.87209700351

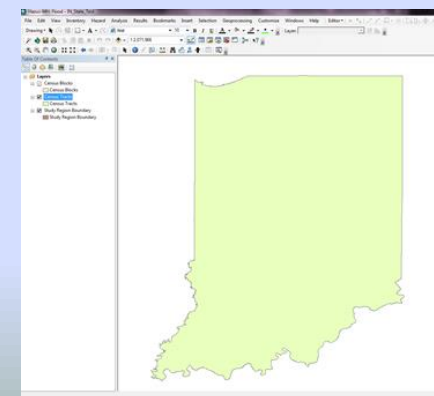
OBJECTID	CountyFips	CountyFips3	CountyName	State	StateFips	NumAggrTri	SHAPE_Leng	SHAPE_Area
18097	097	097	Marion	IN	18	212	17.3353159312	9.87209700351

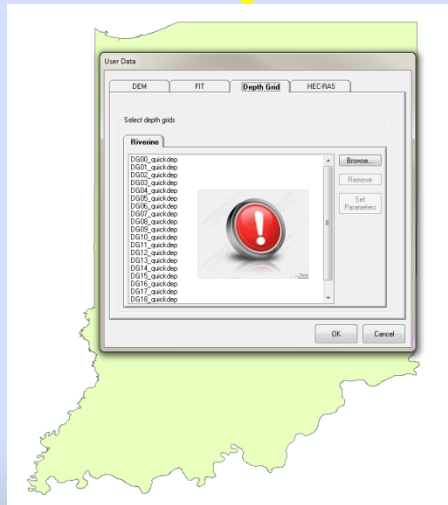
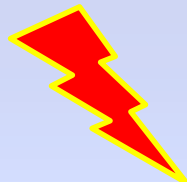


Create a Study Region



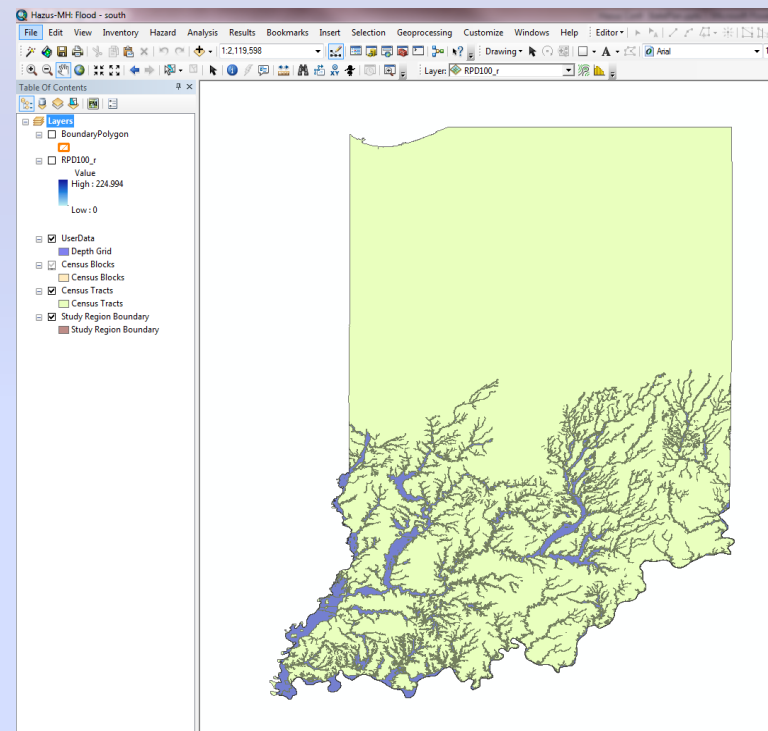
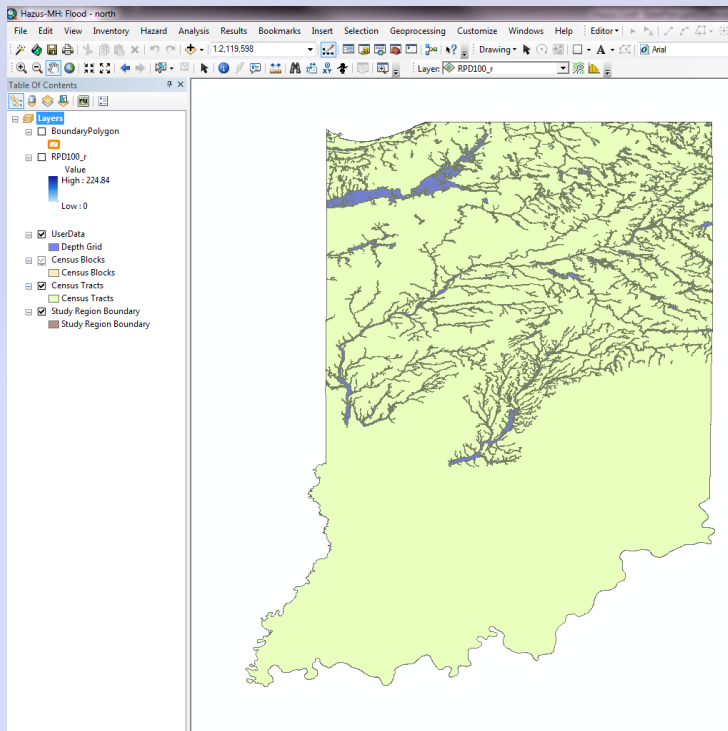
Process the Depth Grids Using 100-yr DFIRM and 10 m DEM



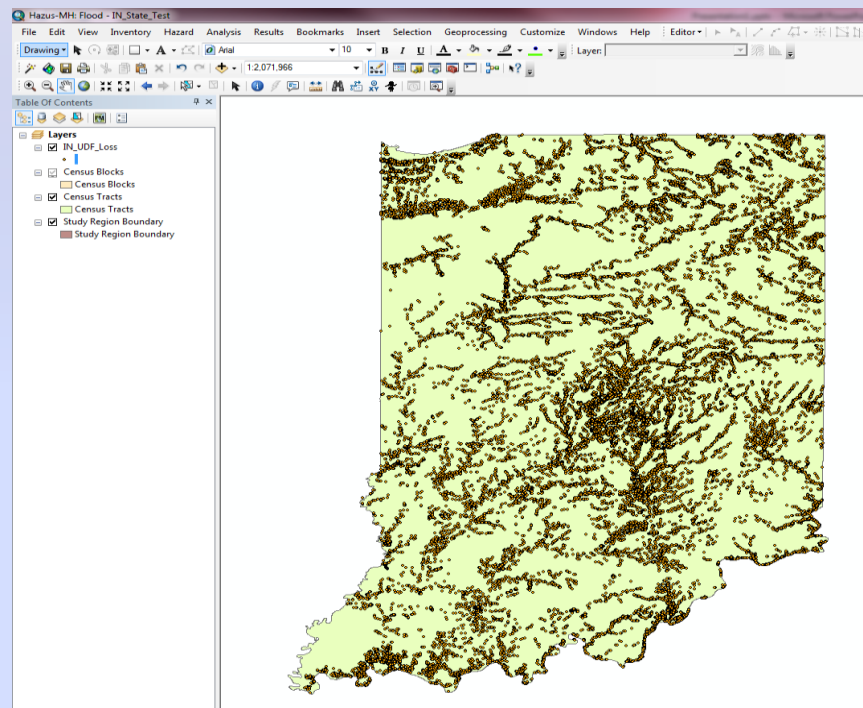


Space limitation in hazus database to store the output depthgrid

~2 days



Output file size ~141 mb
Versus
2 mb



UDF Losses for the state of Indiana



Thank you!



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