

FEMA Releases HAZUS-MH Riverine Flood Model Validation Study



FEMA recently released a validation study of the HAZUS-MH riverine flood loss model, based on a flood event that occurred in St. George, Utah on January 9-11, 2005. The event provided an opportunity to assess if the HAZUS riverine flood model can predict reasonable losses when compared to a real event.

The key findings and conclusions from the study:

- Flood boundaries modeled by HAZUSMH generally estimate actual flood boundaries quite well. However, the estimate of flood boundaries and depth grids are highly dependent on the resolution of the digital terrain data.
- HAZUS-MH cannot accurately model floods that occur in narrow canyons as demonstrated by the overestimation of the modeled flood boundary along the Virgin River upstream of the confluence with the Santa Clara River.
- Along the Santa Clara River, the HAZUS-MH flood extent elevations are comparable with actual flood extend elevations and appear to be in better agreement with the actual flood surface than the 100-year BFEs effective at the time of the flood. It is important to acknowledge that HAZUS-MH losses are only estimates, so particular categories will vary from true losses, especially when looking at an individual site with only Level 1 data.
- HAZUS-MH residential losses along the short reaches of flooded rivers are comparable with true residential losses.
- Building losses due to erosion require editing of the default depth-damage curves in HAZUS-MH to represent significant losses from relatively shallow flood events.



Example of structure damaged by bank erosion during the January 9-11, 2005 flood on the Santa Clara.



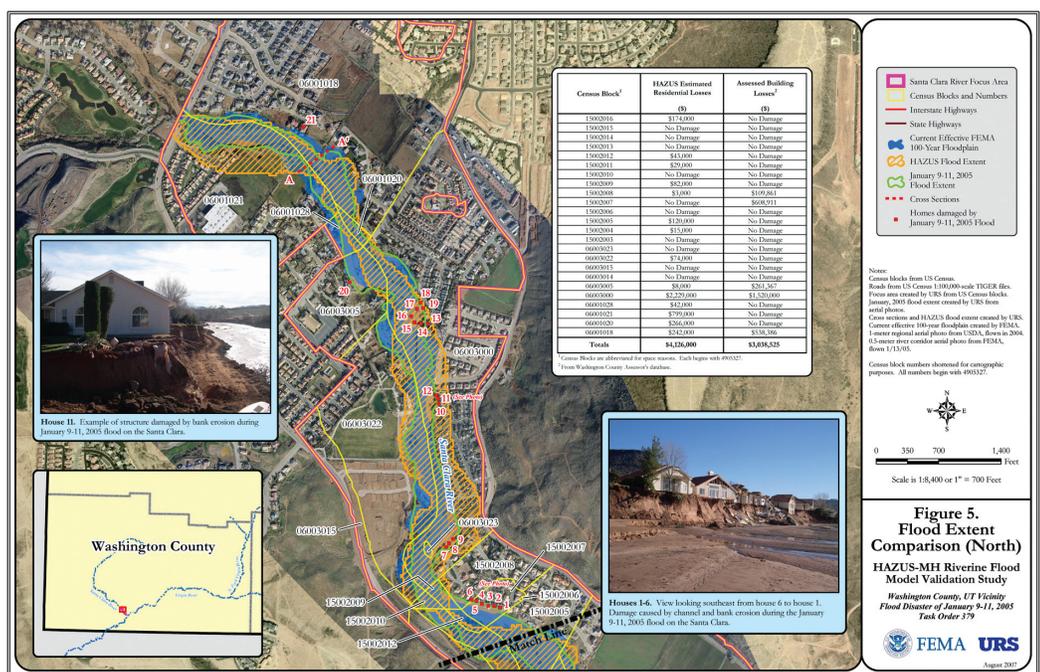
Study Area



FEMA

- Average percent building loss ratios generated by HAZUS-MH are comparable to those using actual assessor's market value data. Comparisons of loss ratios help remove uncertainty caused by different building valuation methodologies.
- Total HAZUS-MH residential losses are approximately 30 percent higher than the total assessed residential losses. Comparing total losses for a study reach is more accurate than comparing total losses at individual census blocks.

The study authors concluded that HAZUS-MH is a useful tool for modeling flood boundaries and in estimating economic and social losses. Provided accurate event flow discharges are available through accurate forecasting, at gages or other known locations along the reach of interest, HAZUS-MH can help provide timely flood boundary and loss estimate information before, during, and after a flood.

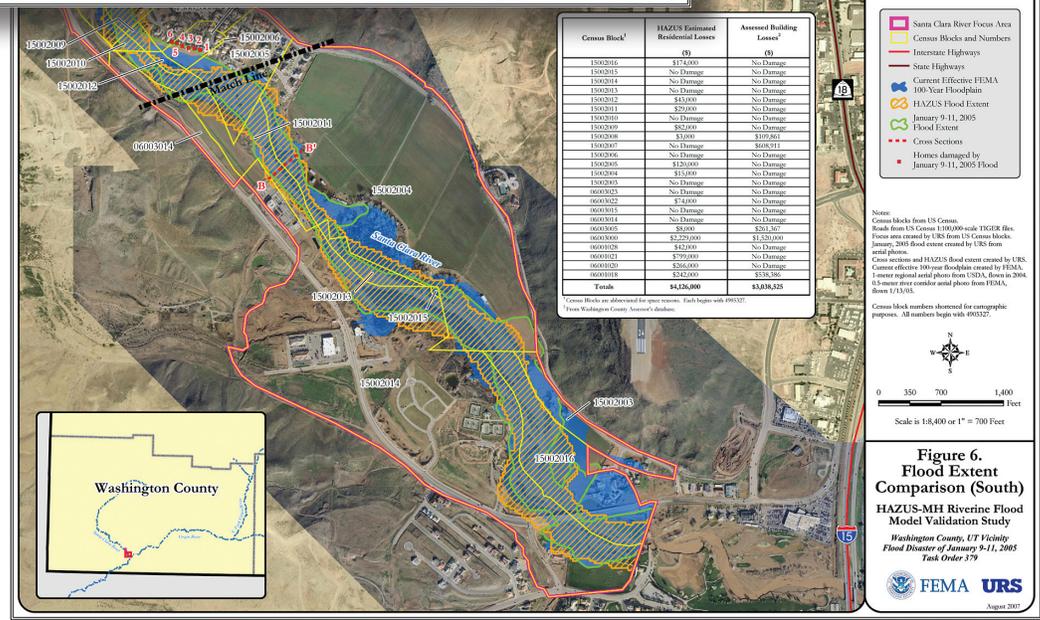


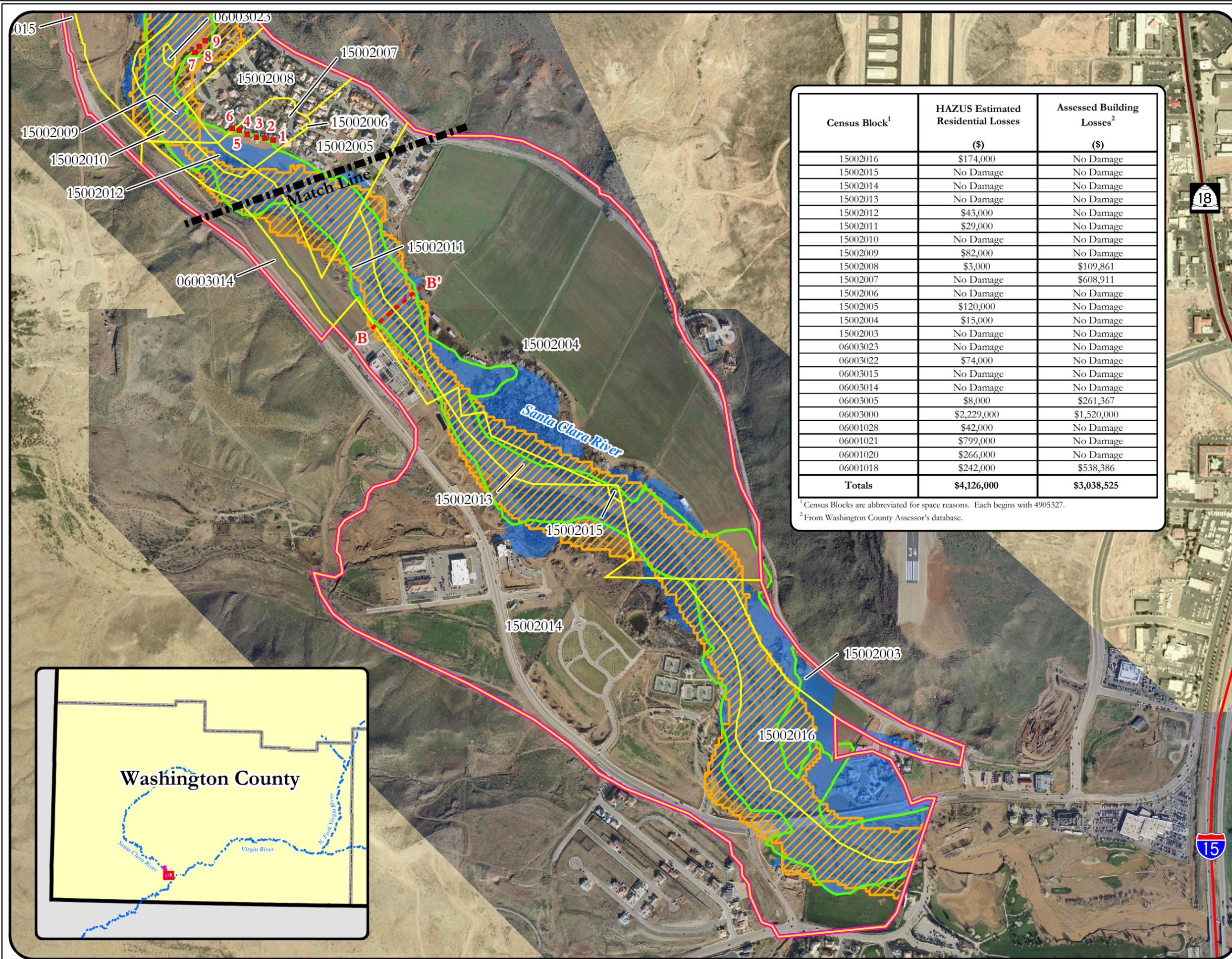
Flood Extent Comparison (North)

< View larger graphic. >

Flood Extent Comparison (South)

< View larger graphic. >





Census Block ¹	HAZUS Estimated Residential Losses (\$)	Assessed Building Losses ² (\$)
15002016	\$174,000	No Damage
15002015	No Damage	No Damage
15002014	No Damage	No Damage
15002013	No Damage	No Damage
15002012	\$43,000	No Damage
15002011	\$29,000	No Damage
15002010	No Damage	No Damage
15002009	\$82,000	No Damage
15002008	\$3,000	\$109,861
15002007	No Damage	\$608,911
15002006	No Damage	No Damage
15002005	\$120,000	No Damage
15002004	\$15,000	No Damage
15002003	No Damage	No Damage
06003023	No Damage	No Damage
06003022	\$74,000	No Damage
06003015	No Damage	No Damage
06003014	No Damage	No Damage
06003005	\$8,000	\$261,367
06003000	\$2,229,000	\$1,520,000
06001028	\$42,000	No Damage
06001021	\$799,000	No Damage
06001020	\$266,000	No Damage
06001018	\$242,000	\$538,386
Totals	\$4,126,000	\$3,038,525

¹ Census Blocks are abbreviated for space reasons. Each begins with 4905327.
² From Washington County Assessor's database.

- Santa Clara River Focus Area
- Census Blocks and Numbers
- Interstate Highways
- State Highways
- Current Effective FEMA 100-Year Floodplain
- HAZUS Flood Extent
- January 9-11, 2005 Flood Extent
- Cross Sections
- Homes damaged by January 9-11, 2005 Flood

Notes:
 Census blocks from US Census.
 Roads from US Census 1:100,000-scale TIGER files.
 Focus area created by URS from US Census blocks.
 January, 2005 flood extent created by URS from aerial photos.
 Cross sections and HAZUS flood extent created by URS.
 Current effective 100-year floodplain created by FEMA.
 1-meter regional aerial photo from USDA, flown in 2004.
 0.5-meter river corridor aerial photo from FEMA, flown 1/13/05.

Census block numbers shortened for cartographic purposes. All numbers begin with 4905327.



Scale is 1:8,400 or 1" = 700 Feet



Figure 6.
Flood Extent Comparison (South)
 HAZUS-MH Riverine Flood Model Validation Study
 Washington County, UT Vicinity
 Flood Disaster of January 9-11, 2005
 Task Order 379

